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ON THE ORIGINS OF THE MEDIAEVAL BAY SYSTEM

WALTER HORN

JOSEPH STRZYGOWSKI advanced the theory in 1924 that the mediaeval bay system had its origins in northern wood construction.[1] This idea was neither accepted nor rejected by architectural historians; it simply failed to be acknowledged, as were so many of the ideas promiscuously conceived and propagated by this ingenious but undisciplined mind. Strzygowski's theory was based upon the assumption that a tradition of bay-divided wooden houses existed in the formative phases of the Romanesque, but at that date he could not point his finger to any bay-divided house that antedated the emergence of the principle of bay division in monumental mediaeval masonry architecture, because the first such house on the Continent had yet to be excavated. Doubtless there are striking similarities between the intensely skeletal churches of the Norman and Frankish Romanesque and certain Scandinavian stave churches (Fig. 1), but none of the churches which Strzygowski cited in support of his theory were of a date sufficiently early to support the hypothesis that they might have been a contributing force in the formation of the Romanesque style, nor could Strzygowski demonstrate that any such churches existed in the Continental cradle areas of the Romanesque —not to speak of the fact that the stave churches to which he referred were centralized structures, and therefore not truly analogous in type to the basilican bay-divided churches of the Continent.[2]

There is no doubt, however, that timber churches were a common phenomenon even on the mediaeval Continent. Not only is there an abundance of documentary references to such structures,[3] but an appreciable number of them survive. Most of these churches have not been properly recorded, however, as nobody has ever gathered this material together. Thus, after some hundred years of intensive architectural research in the course of which we have measured the dimensions of even the smallest stone incorporated into the masonry of every fourth-rate mediaeval country church, the question of the design and constructional layout of a typical Continental mediaeval timber church has been almost entirely neglected.

Of the extant mediaeval timber churches of Continental Europe, probably the most revealing, historically, is the church of St. Catherine at Honfleur, in Normandy, France.[4] In its present state (Fig. 2) this church consists of two parallel naves of equal height and two smaller aisles. But in 1946, Monsieur Jullien, an architect of the Monuments Historiques, made the interesting discovery that in its original form the church was a three-aisled structure.[5] M. Jullien observed that the octagonal wooden posts which separate the two naves in the center still today show on their southern faces the complete original set of the mortise holes which formed the springing of the crossbeams and bracing struts of the original aisle. I had occasion in the summer of 1957 to check these observations and found them to be correct in all detail. On the basis of M. Jullien's carefully measured sections and elevations I have prepared the perspective which is shown in Fig. 3. In this, its original form, St. Catherine's stems most likely from the time of the general economic resurgence which followed the eviction of the English from this city in 1450. Some time after completion but still within the course of the fifteenth century, as can be gathered from the profiles of the mouldings of the new work (the new work being more complex than the original work but still late Gothic in style), the southern aisle was taken down and replaced by a second nave, an alteration to which the church owes its present shape (Fig. 2).

In France, St. Catherine of Honfleur is the oldest surviving building of its kind, but in England the type can be traced back to the fourteenth century, in Germany and Holland to the ninth, in Belgium to the sixth or fifth.

Fig. 4 shows a perspective of a late mediaeval church from the hamlet of Paasloo, Province Overyssel, Holland, which was brought to my attention by Messrs. Jan Jans and E. Jans in Almelo.[6] The walls of the church are built in brick and date from the beginning of the sixteenth century. But the roof-supporting inner trusses of timber appear to be of an earlier date. The original timbers survived until 1954, when, suffering from a heavy infestation of deathwatch beetles, they were completely replaced by modern timbers. The new work, however, is a true copy of the original work. A fifteenth-century church of practically identical construction, again unpublished, stands in the village

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WALTER W. HORN *presented this paper at the 1958 Annual Meeting of the Society at Washington. It summarizes part of the forthcoming book* Aisled Mediaeval Halls and Barns in Timber *which Mr. Horn intends to publish in collaboration with Ernest Born.*

of Nyeven, Province Drente, Holland. The record, however, becomes truly rich as we move across the Channel into England. In the county of Cheshire alone there are five aisled and bay-divided timber churches, and two of those reach back to the fourteenth century: the church of St. James and St. Paul in Marton (Figs. 5–6) and the church of St. Werburgh at Warburton. Two further churches of the same design, but dating from the fifteenth century, are to be seen in Lower Peover and in Holmes Chapel, Cheshire; to these can be added a fifteenth-century church in Mattingly, Hampshire, and a fifteenth-century church in Ribbesford, Worcestershire. The Cheshire churches are reproduced and discussed in Raymond Richards' comprehensive volume on *Old Cheshire Churches*.[7] Numerous other churches of a similar construction type outside of Cheshire may have escaped my attention or may only be brought to light in the future, as the two great archaeological surveys of the *Victoria History of the Counties of England* and the *Royal Commission on Historical Monuments* draw toward their completion.

As in the Continental timber churches previously discussed, so in the above-named English churches the space is subdivided into a nave and two aisles by two rows of free-standing, inner uprights, which are framed together crosswise by means of tie beams and lengthwise by means of plates and purlins.

What vast distribution this construction type must have had in the Middle Ages may be gathered from a mediaeval timber church from Stóry-Nupur in Arnessysla, Iceland, torn down in 1875, but accurately recorded in the form of a scale model now on display in the National Museum at Copenhagen [8] (Fig. 7). The exact date of this church unfortunately is not known, but a Norwegian Book of Homilies from the beginning of the twelfth century contains a complete description of a church which suggests that the Stóry-Nupur type of church was a common concern in the north Germanic territories of Scandinavia and the Atlantic islands.[9]

Until very recently no evidence existed that bay-divided timber churches of this type existed on the Continent during the formative phases of the Romanesque, but in 1947 P. Glazema unearthed in the villages of Buggenum and Grubbenvorst, Holland,[10] two Carolingian churches of this type. In 1948–50 their number was increased to four when the Landesmuseum in Bonn excavated in the villages of Breberen and Doveren, not far from the Dutch border, two more Carolingian churches of the same construction type on sites which had been bombed in World War II.[11] In Fig. 8 I am reproducing one of these as reconstructed by P. J. Tholen.[12] The discovery of these structures, which could be attributed to the eighth and ninth centuries by pottery shards and other accessories, brought added credence to the results of an excavation which had been made in the 'twenties in connection with the old episcopal church of Maastricht, Belgium (5th–6th centuries). In the interior of this church the excavators had discovered the remains of two ranges of flat stones, which could only have served as base blocks for two rows of wooden uprights, dividing the church lengthwise into three aisles of equal width. Albert Verbeek, who discussed this church at the Sixth Congress of German Art Historians, held at Essen in 1956,[13] pointed at the similarity of the general layout of Maastricht Cathedral to that of the pre-Carolingian

FIG. 1. Borgund, Norway. Stave church, *c.* 1150. Section. (Dietrichson-Munthe, *Holzbaukunst Norwegens*)

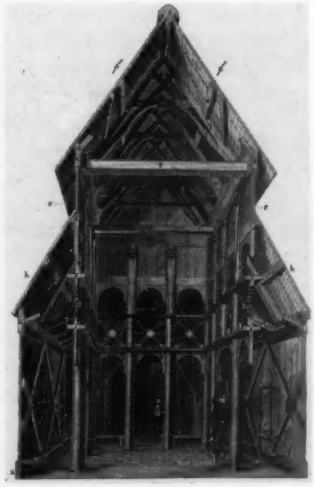


FIG. 2. Honfleur, Normandy, France. St. Catherine's. Interior, present state. (Photo Marburg)

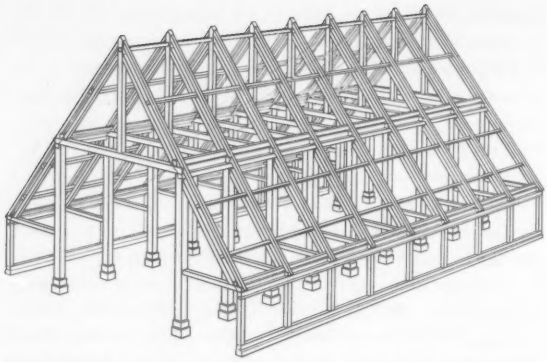


FIG. 3. Honfleur, Normandy, France. St. Catherine's, original state, 15th cent. (Author's reconstruction based on drawings by M. Jullien)

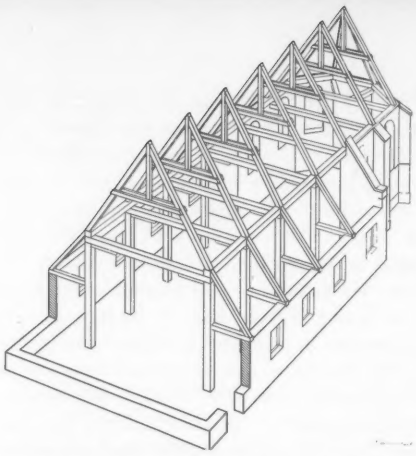


FIG. 4. Paasloo (Prov. Overyssel), Holland. Timber church, 15th–16 cent. (Redrawn by author after plans and sections of architect H. Meijerink, Zwolle)

FIG. 5. Marton (Cheshire), England. St. James' and St. Paul's. Exterior, 14th cent. (After Richards, *Old Cheshire Churches*)

FIG. 6. Marton (Cheshire), England. St. James' and St. Paul's. Interior, 14th cent. (After Richards, *Old Cheshire Churches*)

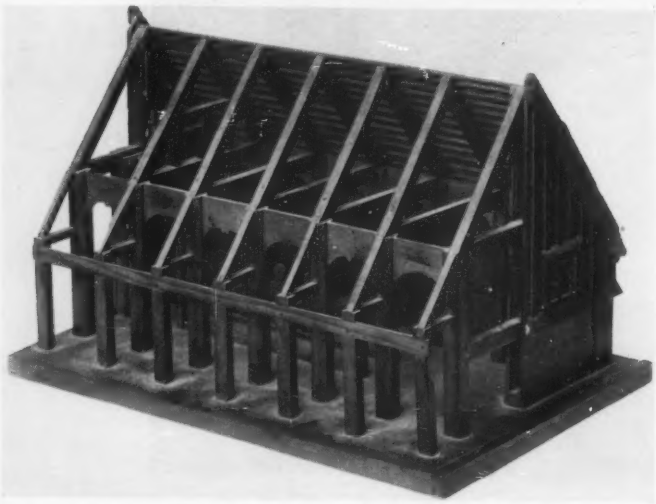


FIG. 7. Stóry-Nupur (Arnessysla), Iceland. Model of mediaeval (?) timber church. Copenhagen, National Museum. (Photo Lennart Larsen)

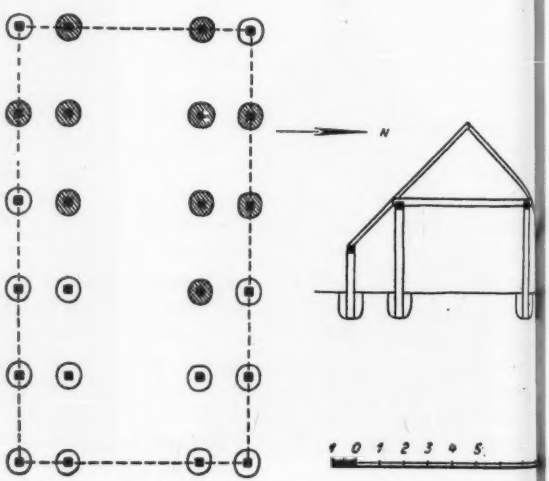


FIG. 8 Breberen (near Aachen), Germany. Carolingian timber church (Reconstruction P. J. Tholen)

churches of Worms and of St. Albans in Mainz, the roofs of which he also presumes to have been supported by two rows of wooden posts.

Taken by themselves these Carolingian and early mediaeval timber churches are inconsequential. Their significance lies in the fact that they tell us that the constructional layout of a Carolingian timber church was substantially that of the surviving mediaeval timber churches just discussed, and—if it is the constructional system of a church like St. Catherine's at Honfleur (Fig. 3) or St. James' and St. Paul's in Marton (Figs. 5–6) that we have to think of when we read in Thietmar's chronicle (to name just one of countless references to mediaeval timber churches that could be cited in this connection) that Bishop Unro of Verden erected in the town of Verden toward the middle of the tenth century a church in timber, and made this church "superior in scale and quality to all other churches" (*et magnitudine et qualitate caeteras precellentem*)[14]—then Strzygowski's theory of the origin of the mediaeval bay system in northern wood construction would indeed require re-examination.

True enough, the evidence so far available is meager, and I would hesitate to base my views about the validity of Strzygowski's theory of the origin of the mediaeval bay system upon the fragile pedigree of mediaeval timber churches above discussed. The inquiry, fortunately, is greatly simplified by the fact that the construction type with which we are here concerned—and here Strzygowski's guess, it has to be admitted, turned out to be correct—was by no means confined to the building of churches. Church construction was only one phase, and centuries before anybody had thought of applying these construction principles to churches they had been a standard procedure in house and barn construction. In Figs. 9 and 10 I show the plan and reconstruction of a prehistoric cattle barn which the Dutch anthropologist Albert Egges van Giffen excavated in 1934–36 in a hamlet called Ezinge, Province Groningen, Holland.[15] It dates from the third century B.C. The details of the roof are not assured but the roof-supporting posts and the braided wattle walls which enclosed the house and subdivided the aisles into stalls for cattle were preserved to hip and even to shoulder height, and the braided fodder mats in front of the posts were found in such good condition that they could be stepped upon without sustaining damage (Fig. 11). The dampness of the ground in conjunction with the acidity of the wood retained the timbers in an unusually fine state of preservation.

This same site revealed on a lower level an entire settlement of houses of the same design, the varying furnishings of which suggest that we are here confronted with an all-purpose house (Figs. 12 and 13). Depending on the respective presence or absence of fireplaces or fodder mats, or their combined appearance in one and the same structure, this construction type—without undergoing even the slightest structural alteration—could be used as shelter for humans alone, as shelter for humans and animals combined, as shelter for animals alone, or as shelter for the storage of produce and harvest. The arrangement of the posts leaves no doubt, in my opinion, that these were bay-divided structures, for although none of the actual timbers of the upper parts of these houses are preserved, the posts could not have successfully braced the roof against the lateral thrust of wind and storm had they not been framed together at the top by means of crossbeams and long-beams. Bay division lay in the nature of the materials employed. The reconstructions reproduced in Figs. 9 and 13 are my own. They do not pretend to be trustworthy in all details and, in fact, having been made some six or seven years ago do not altogether correspond to my present views. Nor do I wish to advance the claim through them that each and every three-aisled Iron Age house that has been excavated so far was bay-divided. But I feel certain that in the Iron Age, bay division was a going concern. In some of the smaller houses, if the uprights were anchored deep enough in the ground the roof might well have been capable of taking the normal thrust of the prevailing winds without having the posts connected crosswise by means of tie beams; but in the larger houses, and especially in such cases where the posts rested on base blocks rather than being sunk into the ground, the uprights must have been connected crosswise as well as lengthwise if the house were to stay up at all.[16]

The Ezinge houses reproduced in Figs. 12 and 13 date from the fourth century B.C. When they were discovered in 1934 they were a relatively rare phenomenon. But between 1934 and 1958 over 200 houses of this construction type have been excavated in Holland, in northern Germany, in Scandinavia, and in England, and today we are able to trace their development, century by century, into the Middle Ages and through the Middle Ages to their modern survival forms.[17] The structural layout of this house-type is well exemplified in a model of a house which Werner Haarnagel excavated in 1949–50 in Wilhelmshaven-Hessens (Fig. 14) where it could be identified in settlement-horizons of the seventh, eighth, ninth, and tenth centuries;[18] and in excavations conducted in 1951–53 in Emden, the same type was discovered in settlement-horizons of the eleventh, twelfth, and thirteenth centuries.[19] For Holland a closely related house-type had been ascertained as early as 1939 for the period of 700–1000 through an excavation undertaken by van Giffen in the vicinity of the parish of Leens, Province Groningen (Fig. 15).[20]

Mediaeval architectural history has responded to these discoveries with a peculiar apathy, and our failure to evaluate this material in its proper context has prevented us from tackling one of the major unsolved problems of mediaeval architectural history—which is, in turn, of greatest importance to the excavators—that of the recon-

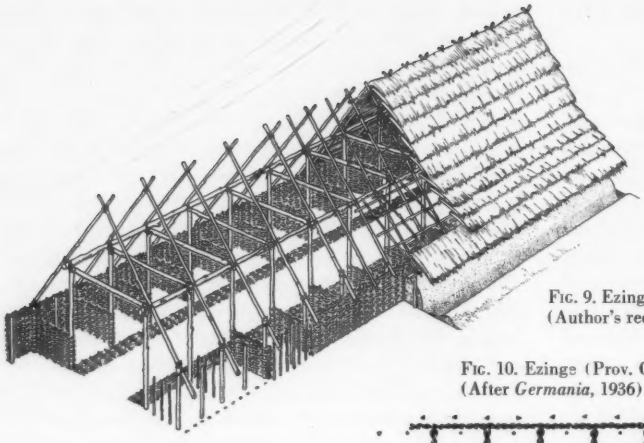
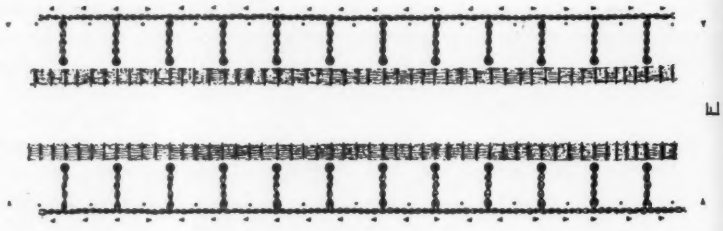


FIG. 9. Ezinge (Prov. Groningen), Holland. Cattle barn, 3rd cent. B.C. (Author's reconstruction, drawn by Walter Schwarz)

FIG. 10. Ezinge (Prov. Groningen), Holland. Cattle barns, 3rd cent. B.C. Plan. (After *Germania*, 1936)



struction of the guest and service buildings of the Plan of St. Gall.

Apart from the monastic buildings proper, i.e., the church, the claustrum, the noviciate and the infirmary, this plan [21] comprises a host of subsidiary structures, which are as common to secular life as they are indispensable to the economy of a monastic settlement. Under this category come such installations as the granaries, the house of the gardener and his crew, the house of the duck and fowl keeper, the house of the workmen, some six or seven structures which serve as shelter for the livestock and its keepers, the so-called "Outer School," and the two monastic guest houses: the House for Visitors of Rank and the Hospice of the Paupers. A typological analysis of the guest and service structures of the Plan of St. Gall shows that they are variants of the house type above discussed. As in the Iron Age houses of Ezinge (Figs. 12–13) and their early mediaeval descendants of Wilhelmshaven-Hessens (Fig. 14) and Leens (Fig. 15), so in the guest and service structures of the Plan of St. Gall the principal portion of the house consists of a large rectangular center room which contains the hearth and serves as common living room, while the more private and more specialized functions, such as sleeping and the stabling for the livestock, are relegated to the peripheral aisles and lean-tos.

Thus in the Guest House for Visitors of Rank (Fig. 16), the center space is used as the common "dining hall" (*domus ad prandendum*), the chambers under the lean-tos as the "bedrooms for the distinguished guests" (*caminatae cum lectis*), the aisles as "servants' quarters" (*cubilia servitorum*) and as "stables for the horses" (*stabula caballorum*). By the same token, in the Hospice of the Paupers the center space serves as "living room for the pilgrims and paupers" (*domus peregrinorum et pauperum*), while the outer rooms are used as dormitories (*dormitorium*), as "quarters for the servants" (*servitorum mansiones*), as "storage room" (*camera*), and as "cellar" (*cellerarium*). Likewise in the House for the Country Servants, as well as in all of the buildings which accommodate the livestock and its keepers, viz., the sheepfold, the goat-shed and the pigsty, the large rectangular center space is designated as the "common living room" (*domus familiae, ipsa domus*, etc.), while the outer rooms serve as "sleeping quarters for the attendant servants" and as "stables" (*cubilia custodientium, cubilia opilionum, cubilia pastorum* and *cavil* or *stabula*). In order to be taken to their stalls the animals had to be led through the common center room. This held true not only for the structures specifically devised for the purpose of housing livestock, but also for buildings of such a highly residential nature as the Guest House for Visitors of Rank, where the horses, likewise, in order to reach their stables had to be guided through the common living room.

In the majority of the guest and service structures of the Plan of St. Gall the center room is surrounded by wings on all four sides (Fig. 16), but on some of the smaller houses (Fig. 17) the aisles are confined to two or three sides only.

FIG. 11. Ezinge (Prov. Groningen), Holland. Cattle barn, 3rd cent. B.C. Excavation photo. (Courtesy of Albert Egges van Giffen)

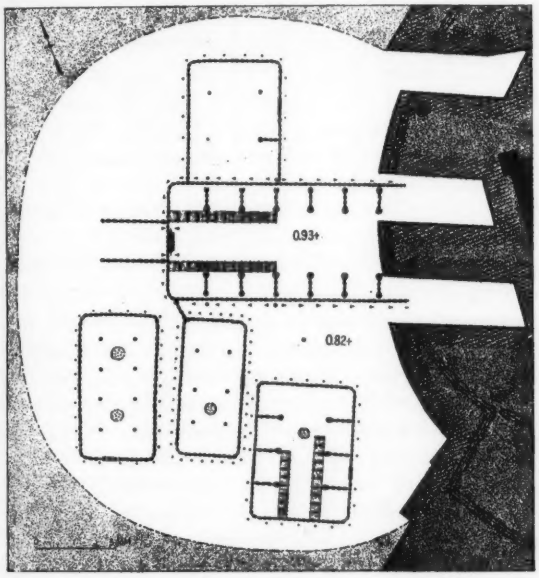


FIG. 12. Ezinge (Prov. Groningen), Holland. Cluster settlement, 4th cent. B.C., Plan. (After *Germania*, 1936)

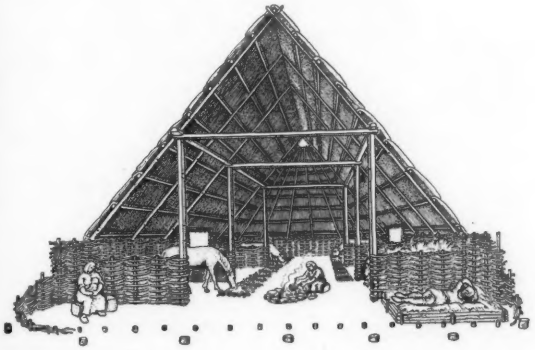


FIG. 13. Ezinge (Prov. Groningen), Holland. House of cluster settlement, 4th cent. B.C. (Author's reconstruction, drawn by Walter Schwarz)

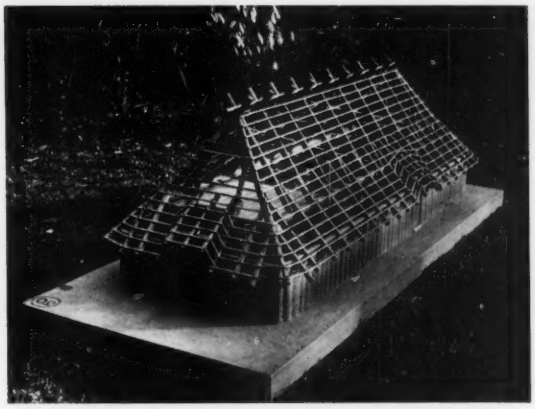
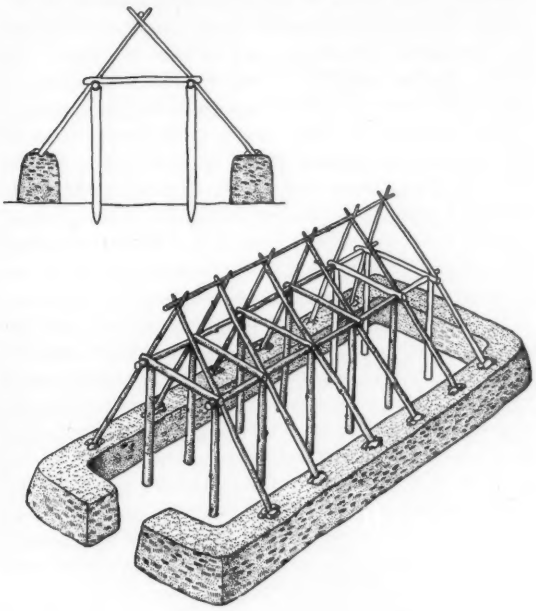


FIG. 14. Wilhelmshaven-Hessens, Germany. Model of mediaeval timber house, 7th-10th cent., Niedersächsische Landesstelle für Marschen- und Wurtenforschung. (Courtesy of Werner Haarnagel)



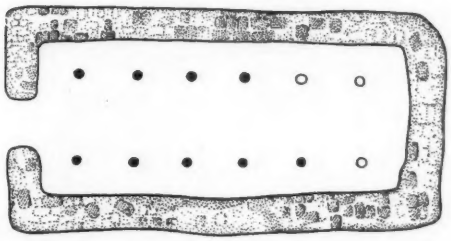


FIG. 15. Leens (Prov. Groningen), Holland. Mediaeval timber house, *c.* 700–*c.* 1000. (Author's reconstruction, drawn by Walter Schwarz)

Two typical examples of this latter kind are the House of the Duck and Fowl Keeper (Fig. 17, left) and the House of the Physician (Fig. 17, center), while the Guest House for Visitors of Rank (Fig. 17, right) is, of course, a typical example of the more common type. Yet in whatever combination this house-type may appear, it is obvious that we are confronted with an all-purpose structure that served a great variety of functions, separate and combined, without entailing even the slightest changes in its basic structural dispositions: it was used in one case as shelter for humans alone, in another as shelter for humans and animals combined, and in still another as storage space for the harvest.

The only mediaeval house-type known to have comparable versatility of functions (while at the same time retaining unaltered all of its basic structural dispositions) is the house-type of Ezinge, Leens, and Wilhelmshaven-Hessens. The Plan of St. Gall gives us an idea of the immense distribution which this house-type must have had in Carolingian Europe—in fact, it holds the key to the entire unsolved problem of Carolingian residential and rural architecture, for granaries, cow sheds, pigsties, sheepfolds, houses for workmen, guests, and country servants belonged to a category of buildings which in the Middle Ages were even more common to secular life than they were to a monastic settlement. In Fig. 18 I have made an attempt to reconstruct the Plan of St. Gall in the light of the excavations discussed above. I shall deal more extensively with this subject in a separate study.

If we have been negligent in keeping abreast with the discoveries made during the last two decades by our colleagues in the field of prehistory, we have been even more remiss with our own material. France and England are replete with the remains of the most extraordinary aisled and bay-divided mediaeval timber structures *which we have not even taken the trouble to record properly*. The oldest surviving aisled and bay-divided timber hall of Europe is the castle hall of Leicester. It dates from around 1150. The historical aspects of this structure have been competently dealt with in a study by Levi Fox,[22] but archaeologically this building is as good as uninvestigated. Reliable plans and sections have never been published and are not even locally available. While of the excavated prehistoric and early mediaeval houses which I discussed above only the ground or bottom timbers survive, in Leicester Castle the situation is exactly reversed. Most of the supporting frame has disappeared, but the roof is preserved. And here we have the earliest residential timber roof of Europe that is still in a perfect state of preservation—a fact which should be of primary concern to the

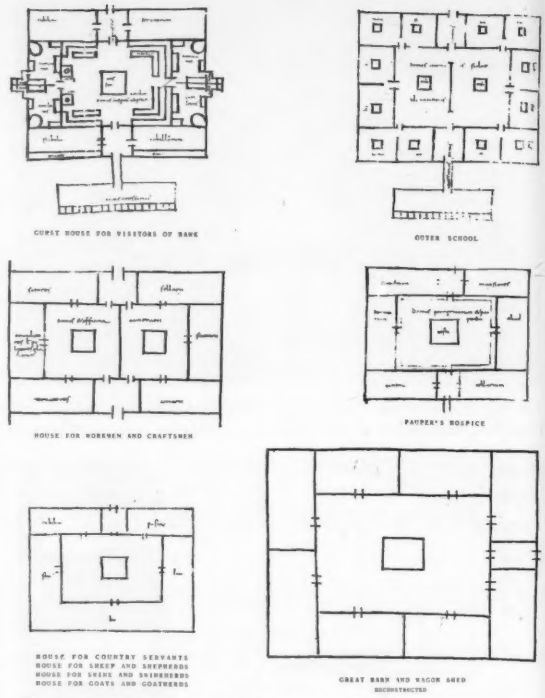

GUEST HOUSE FOR VISITORS OF RANK
OUTER SCHOOL
HOUSE FOR WORKMEN AND CRAFTSMEN
PAUPER'S HOSPICE
HOUSE FOR COUNTRY SERVANTS
HOUSE FOR SHEEP AND SHEPHERDS
HOUSE FOR SWINE AND SWINEHERDS
HOUSE FOR GOATS AND GOATHERDS
GREAT BARN AND WAGON SHED
RECONSTRUCTED

FIG. 16. Plan of St. Gall, *c.* 820. Guest and Service Structures. (After facsimile)

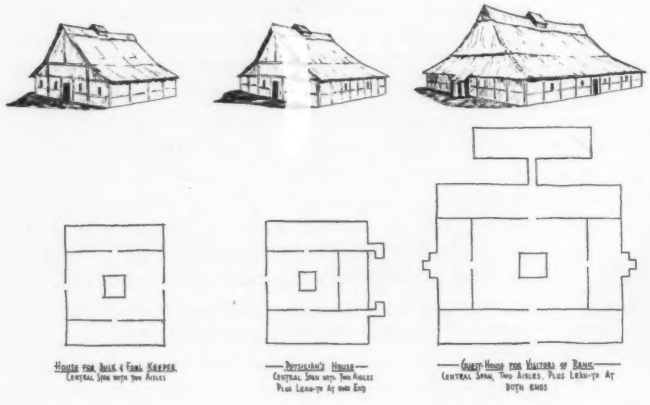
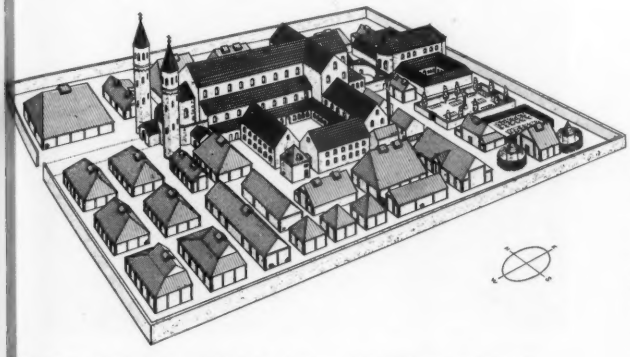

HOUSE FOR DUCK & FOWL KEEPER
CENTRAL SPAN WITH TWO AISLES
PHYSICIAN'S HOUSE
CENTRAL SPAN WITH TWO AISLES
PLUS LEAN-TO AT ONE END
GUEST HOUSE FOR VISITORS OF RANK
CENTRAL SPAN, TWO AISLES, PLUS LEAN-TO AT
BOTH ENDS

FIG. 17. Plan of St. Gall, *c.* 820. Building types. (Author's reconstruction, drawn by William Hill)

prehistorians who have not had the good fortune as yet of finding among their excavated house remains sufficient evidence to be certain about the details of reconstruction of the roof system. I am stressing "in a perfect state of preservation" since British archaeologists have recently displayed a tendency to assume that the original twelfth-century roof of the hall of Leicester Castle might have been replaced by a new one sometime in the course of the fourteenth century. This view has been expressed by Mr. C. A. R. Radford,[23] who observed that the tie beam which lies contiguous to the southern gable wall cuts across the cornice of the arches of the Norman windows, and hence could not have been part of the original work. Mr. Radford's observation is correct, but I cannot follow his conclusion. The timber frame of the hall of Leicester Castle, while originally keyed firmly into the gable walls by means of half-beams which rested on masonry brackets, had simply sunk away from its original level early in the nineteenth century, when the wooden Norman pillars were cropped three feet below the meeting point of tie beams and plates, and then shored by modern timbers resting on modern piers of brick. In the summer of 1957 I had an opportunity to study this roof timber by timber. To my own surprise I found it to be original and homogeneous throughout. The frame is out of plumb and has buckled severely, and in places has sunk away from its original position for a distance of almost two feet, but the timbers *are Norman!* And this holds true not only for the tie beams and the rafters and all of their connecting bracing struts, but also for the heavy plates as well as for the headpieces of the supporting piers and their entire complement of bracing struts. The profiles, mouldings, and scantling of these timbers are Norman and show none of the refinements and mannerisms of fourteenth-century carpentry work.

On one of the walls of the stair well which leads to the private court rooms installed on the modern second floor of the hall there is on display a woodcut of a perspective reconstruction of the hall, which was made in 1917 by T. H. Fosbrooke of Leicester (Fig. 19).[24] Save for a few minor details which can be corrected only after the building has been systematically measured (a task which I hope to be able to undertake next summer), this reconstruction is, in my opinion, basically correct. Fosbrooke's woodcut takes us into the interior of a typical mediaeval castle or manor hall such as must have dotted the European countryside in the twelfth and thirteenth centuries in thousands, if not in hundreds of thousands, of specimens. In the homes of those of the highest social and economic level the traditional timber walls were often replaced by masonry, as is the case in Leicester, but in general they were built in timber.[25] As in the guest and service structures of St. Gall and the prehistoric and early mediaeval houses of Ezinge and Wilhelmshaven-Hessens, so here the hall received its warmth from an open fireplace that burned in the middle of the center aisle. The lord sat at the table on the elevated dais at one of the two narrow ends of the hall, while his retainers took their meals on benches and tables set up along the walls in the aisles of the building. The benches and tables were cleared away after the meal to make room for the bolsters and pillows on which the retainers slept. This is the architectural system of the standard hall not only of the great and powerful lords of the secular order, but also that of the hall of the overlords of the church.

One of the most beautiful feudal halls of England—entirely built in timber—is the palace hall of the Bishop of Hereford. It dates from the same general period as Leicester Hall,[26] is equally well preserved, but has received even less attention from mediaeval architectural historians than the hall of Leicester Castle.[27] The hall appears to have survived in its original form up to the time



s. 18. Plan of St. Gall, *c.* 820. Over-all view. (Author's reconstruction, awn by Walter Schwarz)

FIG. 19. Leicester Castle (Leicestershire), England. Interior of Great Hall. (Reconstruction by T. H. Fosbrooke)

of Bishop Bisse (1713–1721), when it was robbed of its spatial unity by the insertion of a number of inner-wall partitions. It was subjected to further disfiguration under Bishop Atley (1868–1896), who subdivided what remaining open space there was into a jumble of separate rooms by the insertion of further cross partitions and the construction of a second story. It is in the masonry of these eighteenth- and nineteenth-century wall partitions and in the space above the plaster ceilings of the rooms installed by Bishops Bisse and Atley that three of the original wooden piers and a substantial portion of the original wooden arcades can still be seen. While only three of the original bays can now be traced, it is possible that the original structure was comprised of five bays. This at least was the view of John Clayton, to whom we owe the first description of the hall.[28]

John Clayton is the author also of the superb reconstruction reproduced in Fig. 20, which I am publishing here with the kind permission of the Lord Bishop of Hereford and the City Library and Old House Committee of this city.[29] While unreliable in many of its details—especially in the rendering of the roof and the doubtful large transverse arches—this picture nevertheless recreates in an arresting manner the sweeping spatial grandeur of a typical timbered mediaeval palace hall. The large and remarkable arcades of this structure, however, though entirely hewn in timber, are a design feature that is not natural to wood and which already comes, of course, under the influence of stone construction. The standard type of feudal English hall had the traditional timber system of straight long- and crossbeams, framed together with the aid of diagonal bracing struts, and in this form the three-aisled timbered hall served in the Middle Ages not only as a domestic feudal residence, but also as a barn, as a hospital, and as a market hall—even as a church.

Westminster Palace, the largest feudal hall in Europe, and the hall of the kings of England, is unfortunately not preserved in its original form (Fig. 21).[30] Today this hall is covered by a single span, a masterpiece of hammer beam construction, which King Richard II raised at the end of the fourteenth century.[31] But prior to the invention of the arch-braced hammer beam a hall of this enormous width could not have been spanned in single trusses; for that reason there is general agreement among British archaeologists that when this hall was built by William Rufus between 1097 and 1099 its roof must have been supported, like the roofs of the halls of Leicester and Hereford, by two rows of free-standing inner timbers which divided the structure lengthwise into a nave and aisles and crosswise into a sequence of bays.[32] We can make ourselves a convincing picture of what that system must have looked like in its original form by stepping into one of the monumental tithe barns of the great monastic orders, such as the fourteenth-century tithe barn of Great

Fig. 20. Hereford (Herfordshire), England. Interior of Great Hall. (Reconstruction by John Clayton)

Fig. 21. London. Westminster Palace, Great Hall of William Rufus (1079–1099) with roof of Richard II (1394–1402). (Photo *Country Life*)

Coxwell in Berkshire (Figs. 22 and 23).[33] This is, in its essential lines, what the royal hall in the Palace of Westminster must have looked like from the time of William Rufus to that of Richard II when it was the administrative center at which a major portion of the political history of England was forged.

In mediaeval England hall and barn were structurally interchangeable, and if there were any difference between the two it consisted in the fact that the barns, in general, were considerably larger and infinitely more numerous than the halls. No mediaeval manor was in need of more than one hall, but every mediaeval manor needed three to five barns. We are in an excellent position to evaluate the density of distribution of mediaeval barns, not only because of the help provided by the Plan of St. Gall—which gives us the layout of not less than eight such structures—but also because of the survival of a number of written documents of a related nature. One of the most enlightening documents of this type is a dossier of lease agreements of the twelfth century which records the manorial holdings of the dean and chapter of St. Paul's in London.[34] From this inventory we learn that the chapter of St. Paul's derived its sustenance from a total of thirteen manors which were scattered throughout the counties of Hertfordshire, Essex, and Surrey. The number of barns on each of these manors varied from three to five. Thirteen of these barns are so well described that they can be reconstructed on a drawing board. The canon who took the inventory gives us not only the length and width of each barn but, in many cases, even such details as the height and width of the aisles, the height and width of the nave, the depth of the bays and lean-tos, the height from the floor to the crossbeam, and the distance from the crossbeam to the ridge.

In view of the crucial position which this document occupies in the history of the aisled and bay-divided mediaeval timber barn, I shall translate from the Latin, as a typical example, the description of one of three barns which the chapter of St. Paul's owned on its manor at

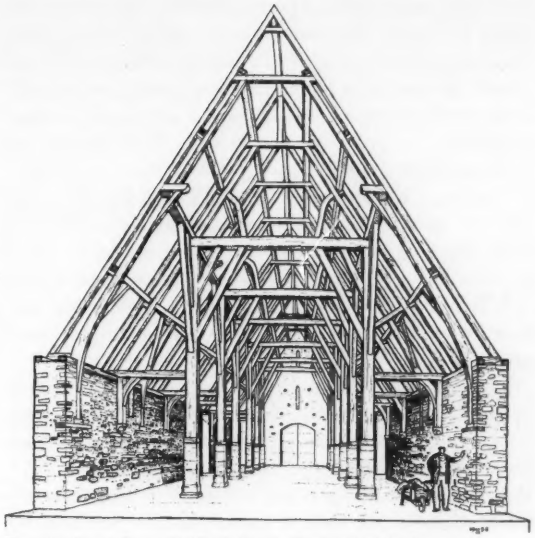


FIG. 22. Great Coxwell (Berkshire), England. Tithe barn, 14th century. Interior. (Drawn by Ernest Born from author's measurements)

Wicham, Essex, and show, in Fig. 24, my reconstruction of the plan and section of this barn.

The third barn, which lies further east, is 49½ feet long, not counting its lean-tos, which have a depth of 22 feet. The height of this barn below the tie beam is 15 feet, and above, between the tie beam and the ridge, it is 9½ feet. The nave is 22½ feet wide, and each of its two aisles is 6½ feet wide and 8 feet high. This barn Ailwinus must render full of summer wheat from the entrance toward the east, and from the entrance toward the west it must be full of oats. The center [bay] opposite the entrance must remain empty. It is 11½ feet wide.

The largest of the barns described in the leases of St. Paul's is a barn in a place called Walton on the manor of Adulvesnasa, Essex (Fig. 25). It measured 168 feet in length, 53 feet in width, and 33½ feet in height. Its nave was filled to the ridge with huge stacks of oats and sum-

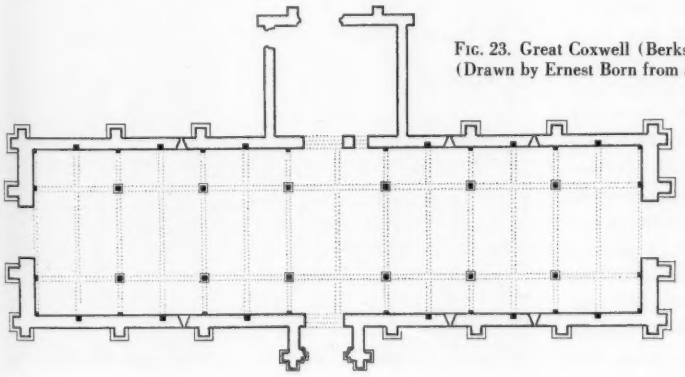


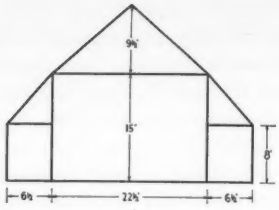
FIG. 23. Great Coxwell (Berkshire), England. Tithe barn, 14th century. Plan. (Drawn by Ernest Born from author's measurements)

mer wheat, and scattered here and there in the aisles were heaps of barley, the dimensions of which are accurately recorded. This description is a striking tribute to the economic acumen of the landowning corporation which, with these details, made sure that all such goods as a new tenant received on entering the manor were dutifully returned at the termination of the lease.

The lease agreements of St. Paul's range in date from 1114 to 1155.[35] Obviously they establish only a *terminus ante;* they say nothing about the age of the barns. Some of them may have been of relatively recent date. Others may have been centuries old; in fact, may date from any time between the date of inspection and the original land grants in the seventh and eighth centuries.

That barns of this layout and design were as common in the Middle Ages on the Continent as they were in England, we may gather from a glance at Dom Milley's superb engravings of the Abbey of Clairvaux (Figs. 26 and 27).[36] Published in 1708, these engravings show the settlement substantially in the form it had attained by the close of the twelfth century. In the foreground of the bird's-eye view which shows the monastery from the west (Fig. 26), one recognizes two large barns, one lying at right angles, the other parallel to the monastery walls immediately to the right of the entrance. Dom Milley's plan, a detail of which is given in Fig. 27, reveals that these were five- and six-aisled structures, and the scale with which the plan is furnished permits us to establish their dimensions as amounting to 90 by 120 feet and to 72 by 168 feet, respectively. Inserted into the edge of Dom Milley's great perspective, but not visible in Fig. 26, is a view of one of the outlying granges of Clairvaux, the grange of Ultra Albam. It also contains two barns, one subdivided into five, the other into seven, aisles. The larger of these two barns was 210 feet long and 108 feet wide.

The barns of Clairvaux perished when the monastery was demolished in the wake of the French Revolution. Their loss as historical monuments, however deplorable it may be, is not irreparable, as a considerable number of like-type barns survive, both in France and in England. The earliest of these appears to be the abbey grange of Parçay-Meslay, near Tours in France (Figs. 28–31), a dependency of the monastery of Marmoutier. Dom Edmond Martène, a learned French Benedictine of the Congregation of St. Maur (1654–1739), who was thoroughly acquainted with the history and the archives of this monastery, lists the abbey grange of Parçay-Meslay as belonging to a group of buildings which were erected by Abbé Hugue de Rochecorbon (1211–1227).[37] The general character of the masonry work of the barn, its profiles and its mouldings, is in full accord with this date. This impressive structure has a clear inner length of 170 feet, 6 inches, a clear width of 80 feet, 2 inches, and a height to the bottom of the ridgepiece of 44 feet, 4 inches. Reliable plans and sections have never been published, but are available at the Centre de Recherches of the Monuments Historiques in Paris, and the plan reproduced in



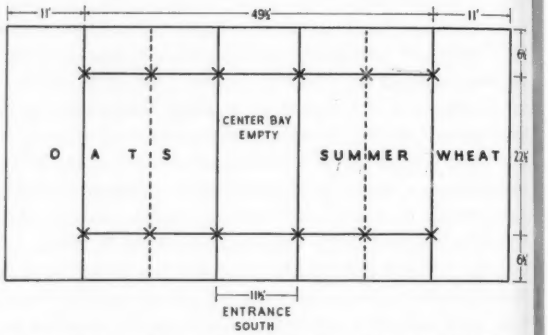
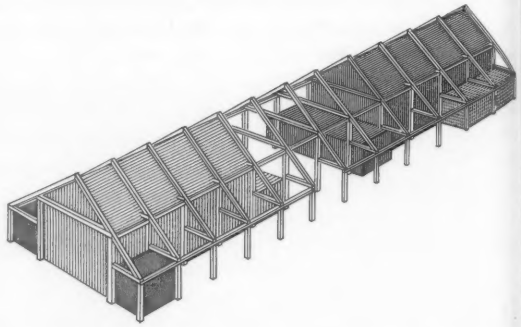


FIG. 24. Wicham (Essex), England. Mediaeval barn described in lease agreement of *c.* 1150. (Author's reconstruction)



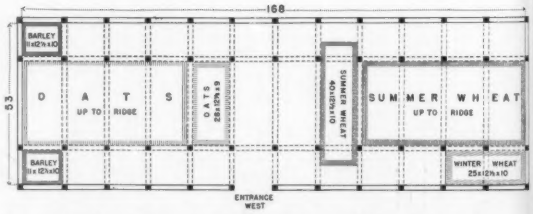


FIG. 25. Walton (Essex), England. Mediaeval barn described in lease agreement of *c.* 1150. (Author's reconstruction, drawn by Walter Schwarz)

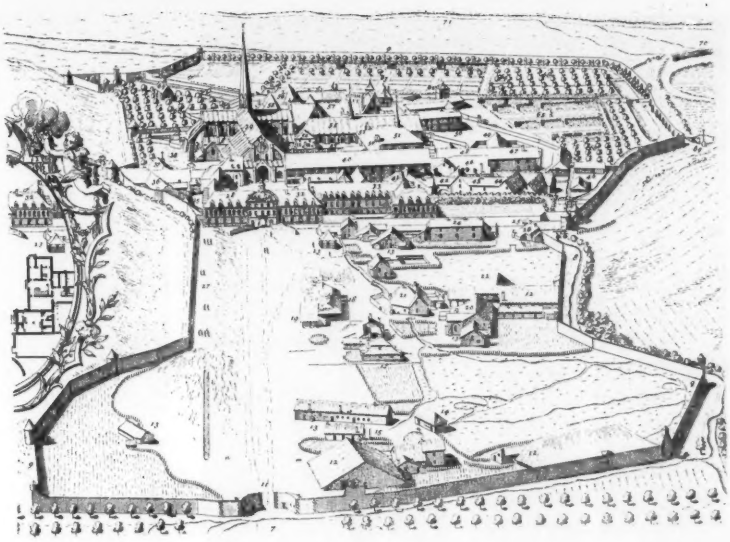
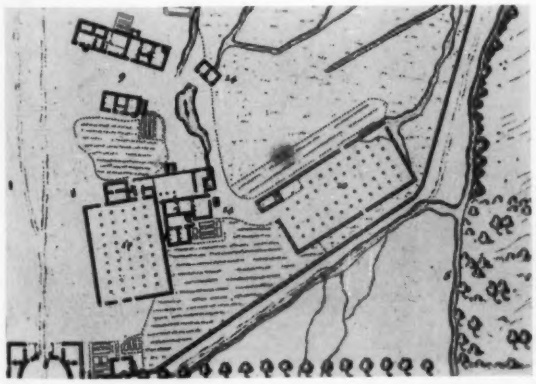


FIG. 26. Monastery of Clairvaux, France. Engraving by Dom Milley, 1708. (Paris, Cabinet des Estampes)

Fig. 31 was made by Ernest Born with the aid of drawings which I owe to the kindness of the Centre de Recherches. Figs. 28 and 29 are the first published photographic views of the barn of Parçay-Meslay. But even expert photography does not render justice to this building; it is only by drawing it up (Fig. 30) that one can capture the cathedral-like appearance of this magnificent frame of timbers which penetrates the space in all directions, dividing it into parts, and at the same time braiding the parts together into an all-embracing coherent whole.

There is some question as to whether the present timbers of the barn of Parçay-Meslay are the original ones. Aymar Verdier, who discussed this building in his *Architecture Civile et Domestique*,[38] reports that Mr. Drouet, who acquired the barn after the French Revolution and saved it from demolition, was of the opinion that the original frame of timber had caught fire during the invasion of the Touraine by the English in 1437. I have no means of judging whether this view was based on any valid historical evidence. But even if the present timbers were proved to date from the fifteenth century, this would have little bearing on the basic argument of this study since we are not concerned here with the changing details of carpentry work, but with the constructional system as a whole—and a sufficient number of other thirteenth-century barns survive to indicate that no noteworthy changes took place between the thirteenth and the fifteenth centuries as far as the principle of bay-division is concerned.

FIG. 27. Monastery of Clairvaux, France. Plan of barns of abbey grange. Engraving by Dom Milley, 1708. (Paris, Cabinet des Estampes)



A thirteenth-century barn of considerable size and beauty, the property of the Abbey of Longchamp, stood within the very boundaries of the city of Paris until the middle of the nineteenth century, when it was taken down to make room for the fashionable race tracks in the Bois de Boulogne. The timbers of the barn are gone, but they were carefully recorded before being dismantled.[39] And further north, in the abbey grange of Canteloup (Eure), in Normandy,[40] and in the abbey grange of Ter Doest in Belgium[41] there are two thirteenth-century barns of even larger dimensions, the timbers of which are still standing in an excellent state of preservation.

Vast and impressive as they are, there is nothing about these barns that is unique. Good documentary evidence suggests that by the close of the twelfth century the Abbey of Clairvaux alone possessed, on its respective granges, not less than twenty-six such structures, and the Abbey of Foigny probably as many as twenty-eight.[42] If we assume that the agricultural economy of the average Cistercian monastery required in each case a minimum of be-

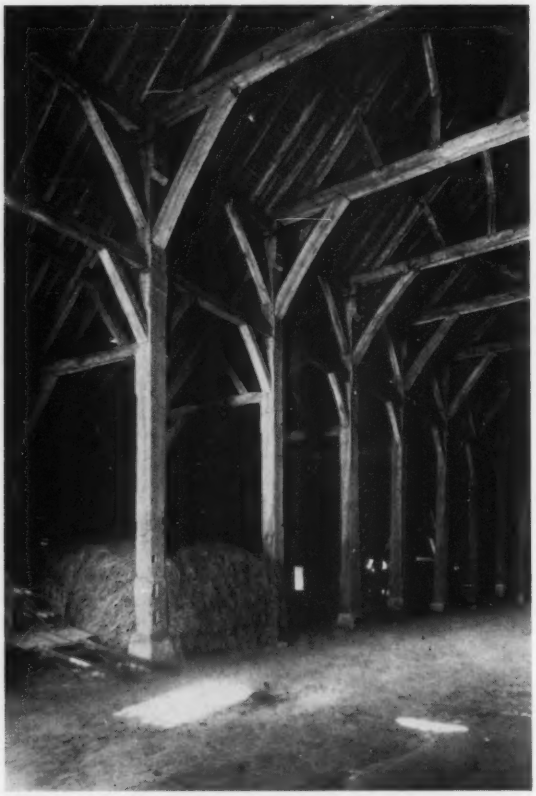


Fig. 29. Parçay-Meslay (Indre-et-Loire), France. Abbey grange, 1211–1227. Interior. (Photo Philip Spencer)

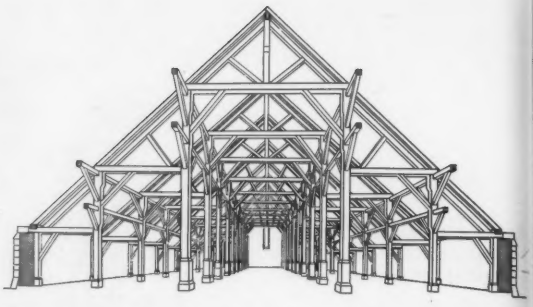


Fig. 30. Parçay-Meslay (Indre-et-Loire), France. Abbey grange, 1211–1227. Perspective. (Author)

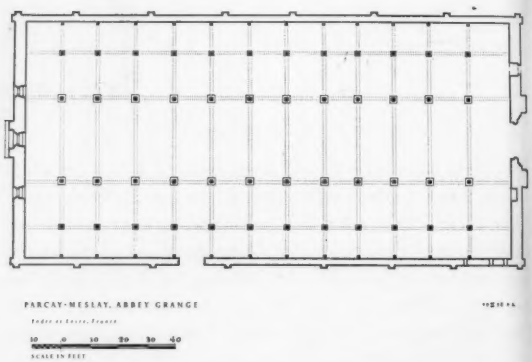


Fig. 31. Parçay-Meslay (Indre-et-Loire), France. Abbey grange, 1211–1227. Plan. (Redrawn by Ernest Born after survey of MM. Ranjard and Faugeron)

tween ten and twenty barns—and the latter figure may come closer to the truth than the former—we would have to infer that by the end of the twelfth century, when the total of Cistercian foundations had risen to about 500, there were not less than 5,000 to 10,000 Cistercian barns alone.

Of the hundreds of thousands of such barns that once undoubtedly were scattered over the mediaeval countryside, some thirty or forty survive, and of them the most beautiful, in my opinion, is the great tithe barn of Harmondsworth in Middlesex (Figs. 32 and 41), whose timbers are still as fresh today as they were in the thirteenth

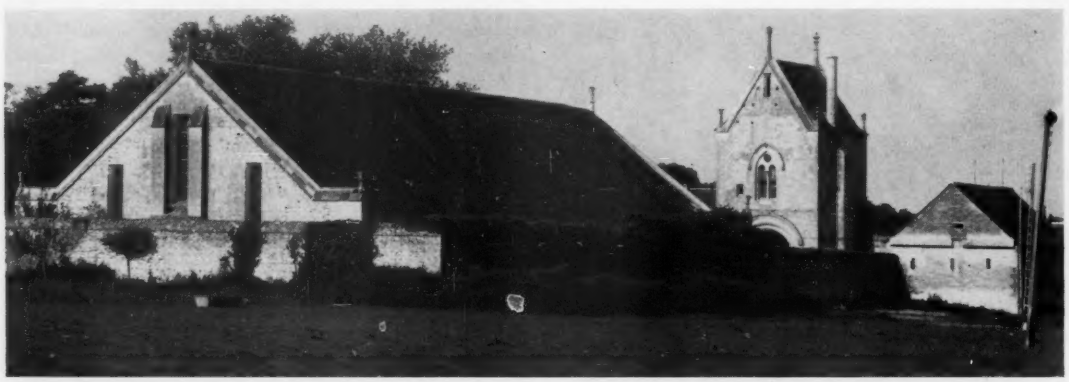


Fig. 28. Parçay-Meslay (Indre-et-Loire), France. Abbey grange, 1211–1227. Exterior from northeast. (Photo Philip Spencer)

Fig. 32. Harmondsworth (Middlesex), England. Tithe barn, 13th cent. Interior. (Royal Commission on Historical Monuments)

Fig. 35. Arpajon (Seine-et-Oise), France. Market hall, 15th cent. Interior. (Photo, Rameau & Fils, Etampes)

Fig. 33. St. Pierre-sur-Dives (Calvados), France. Market hall, 13th (?) cent. Exterior from Southwest. (Photo Philip Spencer)

Fig. 34. St. Pierre-sur-Dives (Calvados), France. Market hall, 13th (?) century. Interior reconstructed after fire of 1944. (Photo Philip Spencer)

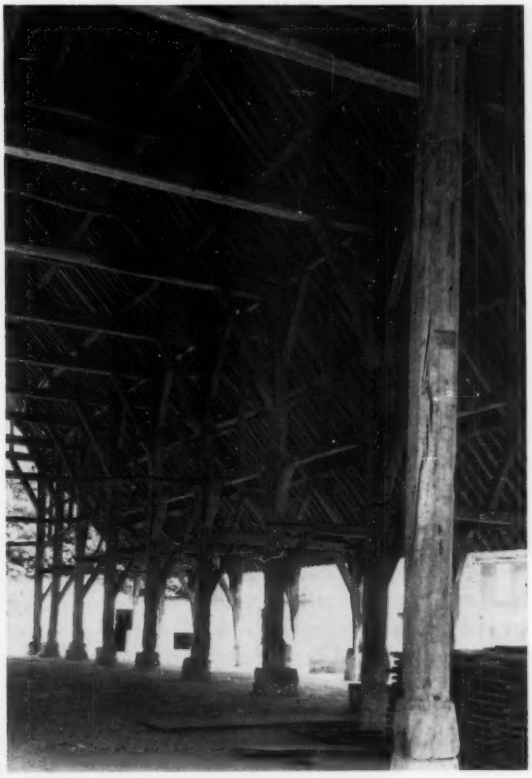


Fig. 36. Méréville (Seine-et-Oise), France. Market hall, 15th cent. Interior. (Photo Philip Spencer)

century when they were hewn and framed together. Harmondsworth barn is mentioned in a list of alien properties seized by the Crown of England from 1288–1386, in an entry which refers to the year 1293–94 (22 Edward I).[43] This barn has the distinction of having been competently described and recorded as early as 1875 by Albert Hartshorne.[44] It is also succinctly dealt with in the volume on Middlesex of the Royal Commission for Historical Monuments in England,[45] where, however, without any substantiating evidence the barn is ascribed (and wrongly, in my opinion) to the fourteenth century. Harmondsworth barn is 191 feet, 10 inches long, 37 feet, 6 inches wide, and 37 feet, 6 inches high. The feeling of grandeur which this structure evokes as one steps over its threshold into its massive forest of rising timbers, can only be compared to that experienced in entering a mediaeval cathedral. If I speak of this barn as the finest and most beautiful of all surviving mediaeval barns of England, I am referring not only to its general proportions—the full nobility of which can only be perceived on the spot—but also to a specific muscular and skeletal type of beauty that occurs only on the highest level of barn construction and finds its expression in an unusually sensitive and convincing down and upward scaling of the timbers, as the eye moves from primary to secondary to tertiary member and back again.

By the time the barns of Parçay-Meslay and of Harmondsworth were built a new variety of the type had sprung into existence, the market hall. The most impressive mediaeval market hall I know of is the hall of the sleepy little country town of St. Pierre-sur-Dives (Calvados), in Normandy, which is here published for the first time (Figs. 33 and 34). It is astonishing that this extraordinary structure should never have found its way into any authoritative treatise on mediaeval architecture. The hall is 225 feet, 6 inches long, 64 feet, 6 inches wide, and 42 feet, 6 inches high, and may go back to the thirteenth century. Unfortunately the hall was shelled in 1944, and its original frame of timber was at that time almost completely destroyed by fire. Under the competent direction of Mr. Jean Merlet, Architect-in-Chief of the Monuments Historiques, the hall was subsequently restored, and this restoration, carried out by a team of carpenters who reproduced the ancient system to its smallest detail, is one of the masterpieces of French conservationism.

Last summer, Philip Spencer and I studied and photographed altogether seven such halls, all of them unpublished. St. Pierre-sur-Dives was the largest, but its timbers are new, and as far as the scantling, the patina, and the texture of the wood are concerned, it is surpassed by a considerably smaller hall in the city of Arpajon (Seine et Oise), some thirty kilometers south of Paris (Fig. 35),[46] which dates from the fifteenth century, and is used—even today—for the same purpose for which it was constructed five centuries ago. A hall of approximately the same dimensions, and so identical in the details of its carpentry work that it must be ascribed to the same master, stands in the nearby city of Milly-la-Forêt. It was erected by Admiral de Graville in 1479, and the patent letter of Louis XI, in which the construction of the hall is authorized, is still preserved in the city archives of Milly.[47] In the same general region of the department of Seine-et-Oise there are three more market halls of similar description—one of outstanding beauty in the city of Méréville (Fig. 36). While they too will probably have to be dated into the fifteenth century, we have good reason to assume that the thirteenth-century halls of Paris cannot have looked much different.

I should now like to summarize what I have tried to demonstrate so far in the analytical part of this study before turning to my conclusions.

Discoveries made during the last two decades by German, English, Dutch, and Scandinavian excavators, and a roundup of a pitifully neglected—in parts even uncharted—area of mediaeval research, suggest that there existed in the Middle Ages an aisled and bay-divided, all-purpose structure in timber, about the imposing density of distribution of which we have been deplorably misinformed in the past. The existence and general prevalence of this type of structure during the formative phases of Romanesque and Gothic architecture casts new light upon Strzygowski's abortive theory of the origin of the mediaeval bay-system in wood construction.

The bay system is one of the principal distinguishing features of mediaeval architecture and is perhaps its most distinguishing single feature. It developed on an architectural organism which by origin was not possessed of this feature, namely, that of the West Roman type of the Early Christian basilica, which, in the wake of a general process of political and cultural Romanization that seized the kingdom of Charlemagne toward the end of the eighth century—as Richard Krautheimer has so convincingly demonstrated[48]—became a leading Frankish building type and the point of departure for the entire development which followed. This West Roman version of the Early Christian basilica was an aggregate of three or more monolithic spaces, internally undivided and of varying dimensions, which shouldered each other axially and transversely, but never intersected one another (cf. Fig. 37, diagram of St. Paul's). The relative measurements of these spaces were not regulated by any set canon of proportions and thus varied greatly. The Romanesque and the Gothic churches, which developed from this prototype form, on the other hand, are bay-divided churches, i.e., churches in which the total space is subdivided into a multitude of equal or homologous parts by means of an all-pervasive skeleton of shafts and arches which act both as divisive and as connective members (cf. Fig. 37, diagrams of Speyer and Amiens Cathedrals).

These concepts are diametrically opposed to one another, and the development which leads from the former to the latter passed through a series of clearly observable steps which have been described frequently and which I shall now recapitulate very briefly.

The first of these consisted of a general rearrangement of the primary geometrical space relationships of the church. The width of the nave and the transept were made equal, their area of intersection, the crossing unit, thus was fixed into a square, and all of the remaining parts of the church were calculated as a multiple of the crossing square. In Carolingian and Ottonian architecture we witness the gradual crystallization of this principle which reaches its apex in the so-called "square schematism" of the Romanesque—but the essential features of this system were already anticipated in the church of the famous Plan of St. Gall of around the year 820 (Fig. 38). For seven decades the emergence of this peculiar system of unit relationships has been discussed by leading architectural historians, and yet no one has ever been able to explain it. I suggest that the geometricity of the floor plan of Carolingian and Ottonian churches and the modular layout of their volume sequence owe their origin to the fact that these churches were constructed by men, to whom—as long as their collective memory could recall—"to build" had been synonymous with building in multiples of a basic spatial unit value.[49] Geometricity and unit sequence had been for them intrinsic elements of timbered frame construction—a feature that becomes strikingly apparent if one glances at the intensely geometrical layout of the large Iron Age cattle barn of Ezinge, Holland (Figs. 9 and 10), or the early mediaeval houses of the type of Wilhelmshaven-Hessens (Figs. 14 and 15).

In Ottonian architecture this steadily increasing trend of calculating the general dimensions of the principal spaces of the church as multiples of a basic unit value gathered added momentum with the introduction of the "alternating support system" which carried into the elevation of the church a rhythm of alternating vertical accents that mirrored in the columnar structure of the wall modular prime relationships which heretofore had been a property of the dimensional organization of the space alone. This was a preliminary to a second decisive step in the development of the mediaeval bay system which was reached when the geometrical layout of the floor plan found muscular embodiment in a system of rising shafts which were engaged into the masonry walls, and when these shafts were interconnected crosswise and lengthwise by means of arches (Figs. 39 and 40). As soon as this point was reached the churches could be vaulted, the walls between the rising shafts and arches could be perforated and were progressively transformed into curtain walls—and thus the Early Christian basilica with its aggregate of neighboring monolithic spaces separated by

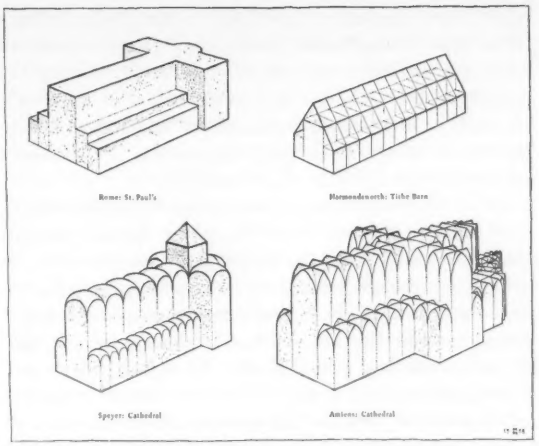


FIG. 37. Space division in Early Christian and mediaeval architecture. (Redrawn by Ernest Born after construction of William Hill)

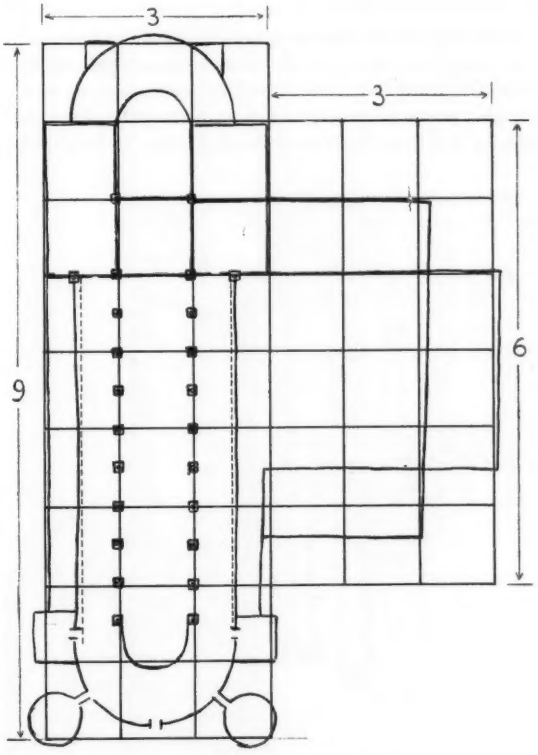


FIG. 38. Plan of St. Gall, *c.* 820. Square schematism of church and claustrum. (Author)

rigid walls had been transformed into that intensely skeletal and bay-divided system of the Romanesque. In church construction as well as in domestic building the totality of the space was now conceived of as a multiple of equal or homologous parts, created by an all-pervasive system of structural members, in function both divisive and connective (cf. Figs. 37, 39, and 40).

It is very hard for me to believe that the appearance of this concept in stone should not have been connected, developmentally, with the fact that in the territories in which this change took place these principles had been for over a millenium a traditional feature of timbered house construction. In timber this concept is old (Fig. 41); in stone it is new (Fig. 40). In timber it flows as a logical construction method from the natural properties of the material, and for that reason could be invented on a relatively primitive cultural level. In masonry it ushered in a conflict between style and matter such as could be handled only on a very sophisticated level of civilization, to the extent of leading in its terminal phase—the Gothic—to a complete denial of the natural properties of the stone.

The great architects of the Renaissance, to whom the Gothic was a "monstrous and barbarous" way of building, were fully aware of this dichotomy between material and style in Gothic architecture, as is expressed in no uncertain terms by Giorgio Vasari, who complained that Gothic buildings "have more the appearance of being made in paper than of stone or marble,"[50] as well as by the author of the famous "Report on the Remains of Ancient Rome" (once believed to be Raphael, but now more commonly ascribed to Bramante or Baldassare Peruzzi), who compared the soaring flight of the Gothic piers and arches with the tensile action of the trunks of living trees, and based upon this simile his puzzling theory of the origins of Gothic architecture in the wooden huts of the primitive forebearers of civilized man.[51] In order to obviate any misconceptions as to my own views in this matter, let me point out that I am not subscribing to Raphael's, Bramante's, or Peruzzi's views. The study with which I am here concerned is devoted to an analysis not of the complex phenomenon of the origins of the Gothic, but to the specific problem of the origins of the mediaeval bay system, a feature which is an integral part of both the Romanesque and the Gothic, without being identical with either.

If, with these qualifications in mind, then, I readvance Strzygowski's ill-conceived idea of the origins of the mediaeval bay system in northern wood construction, I wish to make it clear that I do not mean to imply that the

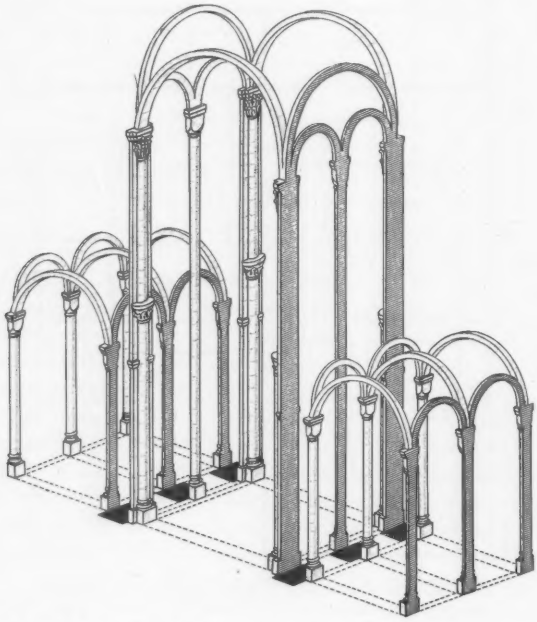


FIG. 39. Speyer Cathedral. Bay system. (Author, drawing by Walter Schwarz)

FIG. 40. Speyer Cathedral. Nave, 11th cent. (Dehio, *Gesch. der deutschen Kunst*)

architectural system of the Romanesque and Gothic emerged mechanically like a chemical formula from the simple historical superimposition or interpenetration of two formerly separate building traditions: that of the Early Christian stone basilica and that of the mediaeval timber house. Primarily and above all, of course, the architectural systems of the Romanesque and Gothic are the expression of a spiritual experience, and in the Middle Ages, bay division was as much of a cultural phenomenon as it was a principle of architectural composition.

Sometime between the year 1230 and 1236 a leading French scholastic, William from Auvergne, gave the finishing touches to a book which dealt with the structure of the universe (*Liber de Universo*) and aimed at a total integration of the metaphysical concepts prevailing in his time into a rounded metaphysical vision. The universe here is envisaged as a triad of structurally related hierarchies (Fig. 42),[52] each a mirror reflection of the other as well as of the system as a whole with its identical subdivisions into triads of triads of ranks, and in each of these triads each subordinate rank corresponds in substance to its equivalent part in every other triad. The architectural plan that underlies this metaphysical scheme displays the most astounding analogies with that of the Gothic bay system. As in the latter, so here the whole "is arranged according to a system of homologous parts, and parts of parts"—if I may be permitted to apply to the *substance* of a metaphysical concept a definition which Panofsky in his brilliant essay on Gothic architecture and scholasticism has coined with regard to the *formal layout* of the scholastic treatise.[53]

In its ultimate analysis, then, I would say the problem of the mediaeval bay system cannot be separated from the rank division of the feudal order, the ecclesiastical order, and the celestial order, and it is in these areas, of course, that we must search for the primary spiritual forces that brought about the transformation of that sluggish organism of the Early Christian basilica into that highly flexible, highly complex, incredibly sophisticated, but equally emotive, organism of the Gothic cathedral. In order to be expressive of the thinking of that period, architecture required a style in which the whole could be conceived as a multiple of homologous parts, and in order to create such a style the rigid Early Christian basilica had to be converted from a monolithic into a cellular and from a crustacian into a skeletal structure. In facing this task, mediaeval architects had the signal advantage of being able to draw on a tradition in which bay division and skeletal construction had been for over a millenium a guiding prin-

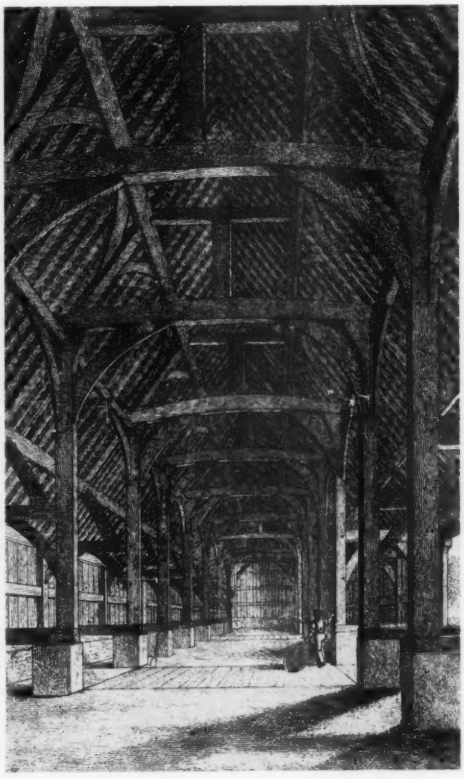


Fig. 41. Harmondsworth (Middlesex), England. Tithe barn, 13th cent. (Albert Hartshorne)

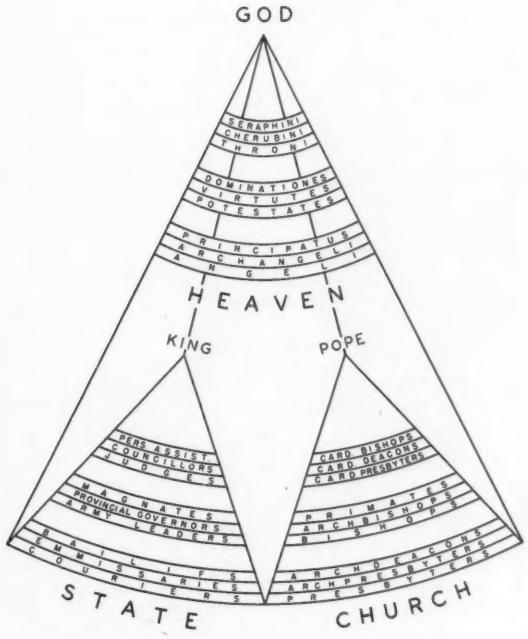


Fig. 42. William fr. Auvergne, *Liber de Universo*, Hierarchies of Heaven, State and Church. (Author)

ciple of construction for the houses in which they dwelled, the halls from which they ruled and governed their land, the barns in which they sheltered their livestock and harvest, the markets in which they traded their produce and even, to some extent, the churches in which they worshiped.

In submitting this theory I should like to end on a precautionary note. I have stressed the native northern aspect of the mediaeval bay system because this aspect has been generally neglected. But in strongly underscoring what I feel to be in need of primary emphasis I do not mean to diminish the importance of other factors which also may have had a bearing on this matter. While the bay system in the form in which it is here defined is, in my opinion, a typical mediaeval feature, its primary constituent part —the bay—was known to the Romans, and the morphology of the vaulted canopies of stone which frame the bays of Speyer Cathedral (Fig. 40) is, of course, a direct derivative of the Roman groin vault, of which the mediaeval masons had learned to make use, first in the crypts, then in the aisles, and finally in the naves of their churches. It is an incontrovertible historical fact, however, that the vaulted Roman canopy had not found a place of survival in any of the principal spaces of the large Early Christian basilicas of the western type from which the mediaeval development took its point of departure. Nevertheless there existed, in the sixth century, two churches in northern Syria which had their nave divided into large bays by means of large transverse arches: the basilica of St. Sergios at Rusafa (Fig. 43) and the Bissos church at Ruweha.[54] I consider it unlikely that either of these two churches exercised appreciable influence upon the development of the mediaeval bay system. They lie in territory which early in the seventh century had fallen into the hands of the Arabs and which remained outside the sphere of western accessibility even during the time of the Crusades, not to mention the fact that by the time the earliest Crusade took place, in 1096, the mediaeval bay system had already found its full embodiment in the Cathedral of Speyer.

Yet even if I should be wrong in this assumption—or if it could be demonstrated that similar or related types were known to mediaeval masons and architects—it must still be pointed out that in Rusafa and in Ruweha bay division remained confined to the nave of the church and was not extended to the church as a whole. The Rusafa-Ruweha bays actually are large compartments rather than bays, and were created by the simple insertion into the nave of the church of two monumental transverse arches carried by elongated piers, but the masonry of the nave walls—diminished as it may be by arcades of extraordinary width—is not reduced to an analogous system of structural members. It is in the full absorption of mass in structure on the one hand, and in the development of an all-pervasive armature of space-dividing and space-connecting shafts and arches on the other hand, that I see the common denominator of the bay division of the Romanesque and Gothic and the bay division of the timbered halls and houses of transalpine Europe.

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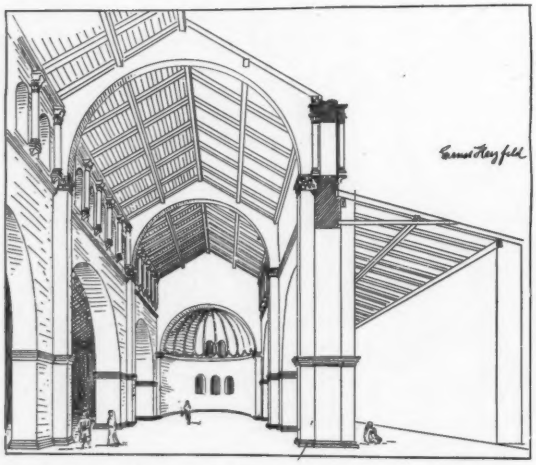


FIG. 43. Rusafa, Northern Syria. S. Sergios Church, 6th cent. (Sarre-Herzfeld)

To the unselfish and generous assistance of architect Ernest Born of San Francisco I owe the magnificent plans and sections of Great Coxwell and Parçay-Meslay, published in Figs. 22, 23, and 31, as well as the final version of the diagrammatic studies reproduced in Fig. 37. I should also like to express my appreciation to William Hill of Pomona College who drew the sketch of the St. Gall houses reproduced in Fig. 17 and did all the constructional work involved in Fig. 37, and also to Walter Schwarz of Berkeley whose expert hand produced the drawings shown in Figs. 9, 13, 15, 18, 25, and 39. Figs. 28, 29, 33, 34, and 36 are but a small sampling of a great number of photographs of unusual quality which my friend and student Philip Spencer took in the summer of 1957, as he accompanied me through France and England. No words express my full debt of gratitude to his devoted assistance in this work.

1. Josef Strzygowski, "Die Europäische Kunst," *Belvedere*, 26 (1924), 35–55; cf. in particular p. 43. The idea is voiced again in Strzygowski's *Nordischer Heilbringer und Bildende Kunst* (Vienna and Leipzig, 1939), p. 233.

2. On the derivation of the Scandinavian stave churches from central prototypes see Gerda Boëthius, "Stavkyrkans Ursprung och Utveckling," *Festskrift Johnny Roosval* (Stockholm, 1929), pp. 18–33.

3. For rapid, if only partial, orientation see the references listed

under the terms *ligneus* or *bois* in the indices of the following works: Otto Lehmann-Brockhaus, *Schriftquellen zur Kunstgeschichte des 11. und 12. Jahrhunderts für Deutschland, Lothringen und Italien* (Berlin, 1938); Victor Mortet, *Recueil de textes relatifs à l'histoire de l'architecture en France au Moyen Age, XIe-XIIe siècles* (Paris, 1911); Victor Mortet and Paul Deschamps, *Recueil de textes relatifs à l'histoire de l'architecture en France au Moyen Age, XIIe-XIIIe siècles* (Paris, 1929).

4. St. Catherine's is briefly dealt with by M. de Caumont in *Statistique Monumentale du Calvados* (Paris-Caen, 1862), IV, 323–328, but has never become the subject of a special monograph, which is badly needed.

5. Monsieur Jullien's observations have not been published but are incorporated into a set of carefully measured drawings which are on file in the Centre de Recherches of the Monument Historiques in Paris. Prints of these I owe to the kindness of Mlles. Bertholier and Bloch of the Monuments Historiques.

6. The perspective shown in Fig. 4 is derived from a set of plans and elevations made by architect H. Meijerink in Zwolle, who restored the church in 1954. Copies of these I owe to the kindness of Messrs. Jan and E. Jans of Almelo, to whom I am likewise indebted for the following historical information conveyed to me by Pastor H. L. Lieve of Paasloo: Permission to build a church at Paasloo was granted in 1336 by the chapter of St. Clement's in Steenwyk, according to a document in the archives of St. Clement's. Judging from foundations which were discovered some three feet inward of the walls of the present church, this building must have been a little smaller than the present church. Until 1486 the church of Paasloo was the principal church of the district. Thereafter it sank into the status of a chapel, and Oldemarkt became the seat of the principal church.

7. Raymond Richards, *Old Cheshire Churches* (London, 1947). For Marton, cf. pp. 229–231; for Warburton, pp. 339–341; for Lower Peover, pp. 200–204; for Holmes Chapel, pp. 186–190. To Mr. Richards I am indebted for the permission to reproduce the photographs of St. James' and St. Paul's in Marton shown in Figs. 5–6. Most of the churches listed above are also dealt with in Fred H. Crossley, *Timber Building in England* (London-New York, 1951), pp. 32 ff., where one will also find a reproduction of the handsome late mediaeval timber church of Coppenhall, Cheshire, which was torn down in 1821. For a description and photographic reproductions of the church of Mattingly, cf. *Victoria History of the Counties of England, Hampshire* (London, 1911), IV, 50 ff.; for Ribbesford, *ibid., Worcestershire,* (London, 1924), IV, 312–314.

8. The church is mentioned in Daniel Brunn, *Fortidsminder og Nutidshjem paa Island* (Copenhagen, 1898), p. 212.

9. Gamal Norsk Homiliebok, Cod. AM 619, ed. Gustav Ludvig Indrebø, *Norske historiske kjeldeskriftfond, Skrifter,* Vol. 54 (Oslo, 1931).

10. Dr. P. Glazema, "Outheidkundige opgravingen in door de oorlog verwoeste Limburgse Kerken," *Publications de la Société Historique et Archéologique dans le Limbourg,* 84 (1948), 226–232, 252–258.

11. Kurt Böhner, Peter Joseph Tholen, and Rafael von Uslar, "Ausgrabungen in den Kirchen von Breberen und Doveren," *Bonner Jahrbücher,* Heft 150 (1950), 192–228.

12. Reproduced after *Werdendes Abendland an Rhein und Ruhr* (Ausstellung in Villa Hügel, Essen, 18 May-15 September, 1956), p. 95, Fig. 9.

13. Albert Verbeek, "Eine merovingische Kathedrale?", *Kunstchronik,* 9 (1956), 280–281, with plan on p. 280.

14. Cf. Otto Lehmann-Brockhaus, *Die Kunst des 10. Jahrhunderts im Lichte der Schriftquellen* (Akademische Abhandlungen zur Kulturgeschichte, 3rd series [Strassburg, 1935]), VI, 13 ff. To the incident mentioned above I add here at random two further typical examples. After the destruction of the Cathedral of Hamburg by the Slavs, Bishop Unwanus (who acceded to the episcopal see in 1013) rebuilt the episcopal "church and all of its appendices in timber" (*ecclesiam et diversoria . . . omnia lignea*). (Cf. Otto Lehmann-Brockhaus, *Schriftquellen zur Kunstgeschichte des 11. und 12. Jahrhunderts für Deutschland, Lothringen und Italien* [Berlin, 1938], pp. 108–109.) Even as late as 1184 the Emperor Frederic Barbarossa erected in the triangular plain formed by the confluence of the rivers Rhine and Main "a church of considerable size and a stately palace in timber" (*ecclesiam maximam et palatium de lignis honestissime fieri iusserat*), "together with numerous other structures of varying description for the purpose of celebrating in the most magnificent manner the great feast of Joy" (i.e., the coronation of his son Henry as King of Germany). And the reason for this was "the narrowness of the streets in the city of Mainz and the bad air prevailing there." Cf. *Arnoldi Chronica Slavorum,* ed. Heinrich Pertz (Hannover, 1868), p. 88.

15. Albert Egges van Giffen, "Der Warf in Ezinge, Prov. Groningen, Holland und seine Westgermanischen Häuser," *Germania,* 20 (1936), 40–47. To Mr. van Giffen I am greatly indebted for the excavation photograph reproduced in Fig. 11.

16. This holds true for a three-aisled Iron Age house which was excavated in 1940 on the Aalburg, near Belfort, Luxembourg, and which even antedates the earliest Ezinge houses (cf. Gustav Riek, "Ein Fletthaus aus der Wende ältere-jüngere Hunsrück-Eiffelkultur bei Belfort, Luxemburg," *Germania,* 26 [1942], 26–34). The reconstruction problems of this, as well as many other Iron Age houses, are discussed authoritatively by Adelhart Zippelius, in "Das vormittelalterliche dreischiffige Hallenhaus in Mitteleuropa," *Bonner Jahrbücher,* 153 (1953), 13–45.

17. I am confining myself here to the most summary bibliography. The material excavated in Holland and in Germany is not summarized at any place, so far as I know, and is scattered through a vast array of prehistoric and regional periodicals, many of which are not easily available in this country. Good surveys of the Swedish material are to be found in such works as: John Nihlen and Gerda Boëthius, *Gotländska gårdar och byar undre äldre järnaldern* (Stockholm, 1933); Mårten Stenberger, *Öland under aldre järnaldern* (Stockholm, 1933), and Mårten Stenberger, *Vallhagar, A Migration Period Settlement on Gotland, Sweden* (2 vols.; Copenhagen, 1955). The Norwegian material excavated prior to 1942 is summarized in Sigurd Grieg, "The House in Norwegian Archaeology," *Acta Archaeologica,* 13 (1942), 169–178; for the Danish material excavated prior to 1937 see Gudmund Hatt, "Dwelling Houses in Jutland in the Iron Age," *Antiquity,* 2 (1937), 162–173. For later material cf. Paul Nørlund, *Trelleborg* (Copenhagen, 1948). For Iceland, cf. Mårten Stenberger, *Forntida Gårdar I Island* (Copenhagen, 1943). A royal Anglo-Saxon palace of the seventh century, comprising a total of twenty-five houses, was excavated in the summer of 1956 in Northumbria, England, by Mr. Brian Hope-Taylor. The results of this excavation are in process of being published by the Ministry of Works. The earliest bay-divided timber house known so far was unearthed in the summer of 1954 in a place called Jemgum, near Emden, Germany. It dates from the period of transition from the Bronze Age to the Iron Age (seventh-sixth centuries, B.C.) and is dealt with in Werner Haarnagel, "Die spätbronze-, früheisenzeitliche Gehöftsiedlung Jemgum bei Leer auf dem linken Ufer der Ems," *Die Kunde,* Neue Folge, 8 (1957), 1–43.

18. Cf. Werner Haarnagel, "Das nordwesteuropäische dreischiffige Hallenhaus und seine Entwicklung im Küstengebiet der Nordsee," *Neues Archiv für Niedersachsen,* 4 (1950), 88–89, and, same author, "Die Flachabdeckung der Wurt Hessens am Jadebusen bei Wilhelmshaven und ihr vorläufiges Ergebnis," *Germania,* 29 (1951), 223–225.

19. Cf. Werner Haarnagel, "Die frühgeschichtliche Handelssiedlung Emden und ihre Entwicklung bis ins Mittelalter," *Friesisches Jahrbuch* (1955), pp. 9–78.

20. Albert Egges van Giffen, "Een Systematic Onderzoek In Em Der Tuinster Wierden Te Leens," *Jaarsverslag Van Den Vereeniging Voor Terpenonderzoek,* 20–24 (1935–1940), 26–117.

21. A full-scale, eight-color, offset facsimile reproduction of the Plan of St. Gall was published in 1952 under the auspices of the Historische Verein des Kantons St. Gallen, and can be obtained through the Fehr'sche Buchhandlung in St. Gall, Switzerland. The facsimile was accompanied by a study of Hans Reinhardt, *Der St. Galler Klosterplan* (92. Neujahrsblatt herausgegeben vom Historischen Verein des Kantons St. Gallen [St. Gall, 1952]).

22. Levi Fox, "Leicester Castle," *Leicester Archaeological Society Transactions,* 21, part 2 (1942–1943), 127–170.

23. In a footnote of C. A. R. Radford's report on "Oakham Castle," published in *Archaeological Journal*, 112 (1956), 181–184; cf. note 1, p. 183.

24. Fosbrooke's reconstruction is mentioned by Margaret Wood, "Norman Domestic Architecture," *Archaeological Journal*, 92 (1935), 191. For a copy of this woodcut, which is here published for the first time as far as I know, I am greatly indebted to Mr. Albert Herbert in Leicester.

25. New light has recently been thrown upon the problem of the aisled mediaeval timber hall by J. T. Smith in an article entitled "Medieval Aisled Halls and Their Derivatives," *Archaeological Journal*, 112 (1956), 76–93. Mr. Smith has also recently made the interesting discovery that the hall of Stokesay Castle was in its original form a three-aisled structure (cf. J. T. Smith, "Stokesay Castle," *Archaeological Journal*, 113 [1957], 211–214).

26. The editors of the Royal Commission on Historical Monuments, *Herefordshire* (London, 1931), Vol. 1, where the hall is dealt with on pp. 116–117, date it into "the late 12th century." Margaret Wood in her "Norman Domestic Architecture," *op. cit.*, p. 188, dates the hall "*c.* 1160." The Rev. Francis T. Havergal in *Fasti Herefordenses and other Antiquarian Memorials of Hereford* (Edinburgh, 1869), p. 136, attributes the hall to Bishop William de Vere (between 1174 and 1199). No record as to the name of the builder of the hall or its date of construction exists, but the Norman character of the work is beyond question.

27. The hall has never been the subject of a special monograph, which is badly needed.

28. John Clayton discussed the hall in 1847 in a paper read before the Royal Institute of British Architects. Extracts of this discussion are to be found in *Fasti Herefordenses*, *op. cit.*, pp. 136–138.

29. Clayton's reconstruction is mentioned in Wood, "Norman Domestic Architecture," *op. cit.*, p. 188. It was not included in John Clayton's work, *Ancient Timber Edifices of England* (London, 1948). A copy of a woodcut fashioned after Clayton's original drawing is in the Refectory Hall of the Bishop's Palace at Hereford, and the City Library of Hereford has a second one. The photograph reproduced in Fig. 24 was made for me by W. H. Bustin & Son in Hereford. It is reproduced with the permission of the Lord Bishop of Hereford and the City Library and Old House Committee. To the Lord Bishop of Hereford as well as to Miss Penelope Morgan and Mr. F. C. Morgan of the Cathedral Library I wish to express my deepest appreciation for their gracious assistance in my studies at Hereford Palace.

30. Here reproduced with the permission of *Country Life*.

31. Westminster Hall is dealt with in W. R. Lethaby, "The Palace of Westminster in the Eleventh and Twelfth Centuries," *Archaeologia*, 60 (1906), 131–141, and by the Royal Commission on Historical Monuments, *London (West)* (London, 1925), pp. 121–123. For the roof specifically cf. Herbert Cescinski and Ernest R. Gribble, "Westminster Hall and Its Roof," *Burlington Magazine*, 40 (1922), 76–84.

32. The belief that Westminster Hall in its original state must have been divided into a nave and aisles by two rows of intermediary supports was first expressed by Sidney Smirke in 1836 ("Remarks on the Architectural History of Westminster Hall," *Archaeologia*, 26 [1836], 416). Smirke's opinion is shared by every authoritative student of the subject, including the late Director of Works, Sir Frank Baines. Cf. Lethaby, *op. cit.*, p. 136; Cescinski and Gribble, *op. cit.*, p. 76; Royal Commission on Historical Monuments, *op. cit.*, p. 121, and Geoffrey Webb, *Architecture in Britain, The Middle Ages* (Baltimore and Harmondsworth, 1956), pp. 66 and 67, Fig. 38.

33. Some good photographs and a cross section of this extraordinary structure have been published by Ralph Tubbs, *The Englishman Builds* (Harmondsworth, 1945), pp. 20–21, but otherwise this barn has not been studied.

34. Published by William Hale Hale, *The Domesday of St. Paul's of the Year MCCXXII . . . and other Original Documents Relating to the Manors and Churches Belonging to the Dean and Chapter of St. Paul's in London, in the Twelfth and Thirteenth Centuries*, printed for the Camden Society (London, 1858). The first to draw attention to this precious document was Sidney Oldall Addy, *The Evolution of the English House* (London, 1898), pp. 67, 129 ff.

35. For the dates see Hale's introductory notes, *op. cit.*, pp. xc-c.

36. One complete set of these engravings is now in the Cabinet des Estampes of the Bibliothèque Nationale at Paris (Topographie de la France, Aube, Arondissement Bar-sur-Aube, fol. 27, 28, and 29); a second one is available in the Archives de l'Aube at the city of Troyes (Bibliothèque de Troyes, Carteron 1, Planches 2, 3, and 4). The best reproductions are to be found in Alphonse Roserot, *Dictionnaire Historique de la Champagne Méridionale (Aube) des Origines à 1790* (Langres, 1942), I, 392 ff.

37. Dom Edmond Martène, "Histoire de l'Abbaye de Marmoutier" (publié et annoté par M. l'abbé C. Chevalier), *Mémoires de la Société Archéologique de Touraine*, 25 (1875), 200.

38. Aymar Verdier and F. Cattois, *Architecture Civile et Domestique au Moyen Age et à la Renaissance* (Paris, 1864), pp. 27–35.

39. Cf. Viollet-le-Duc, *Dictionnaire Raisonné de l'Architecture Française du XIe au XVIe siècle* (Paris, 1863), VI, 43, with plan, section, and elevation.

40. The barn of the abbey grange of Canteloup is summarily described by Philippe Lemaitre, "Notes sur Quelques Granges Dimiéres du Departement de L'Eure," *Bulletin Monumental*, 15 (1849), 196–197, but plans and sections are not available.

41. For plan, section, and elevation of this structure (not altogether reliable, however), see Thomas H. King, *The Study-Book of Mediaeval Architecture and Art* (Edinburgh, 1893), II, Fig. 137; there listed under "Lissewegh."

42. These figures are based on the rough assumption that every grange dependent on the mother settlement required for its agricultural economy a minimum of two barns, like the abbey grange of Clairvaux, and the outlying grange of Ultra Albam. Clairvaux had a total of 12 granges, and six of those had already been established during the lifetime of St. Bernard (d. 1153); Foigny had a total of 14 (cf. Marcel Aubert, *L'Architecture Cistercienne en France* (Paris, 1947), II, 60–161.

43. This document is to be found on Exchequer, Queen's Remembrancer, *Extents, etc., of Alien Priories*, Bundle 2, No. 1, mem. 1 (Reference E. 106/2/1: date 22 Edw. I) and was quoted, but not without errors, in Hartshorne's article mentioned in note 44.

44. Albert Hartshorne, "The Great Barn at Harmondsworth," *London and Middlesex Archaeological Society, Transactions*, 4 (1875), 417 ff.

45. Royal Commission on Historical Monuments in England, *Middlesex* (London, 1937), pp. 61–62. The photograph shown in Fig. 32 is taken from this work and here reproduced by permission of Her Majesty's Stationery Office. To Miss Vera Dallas, Secretary of the Royal Commission on Historical Monuments, I should like to express on this occasion my deepest appreciation for the generous assistance and support which she has extended to me over a period of many years in my research on aisled mediaeval barns and halls in England.

46. Photographs, plans, and sections of the market hall of Arpajon have never been published, to my knowledge, but are on file in the Centre de Recherches of the Monuments Historiques in Paris. (The photograph reproduced in Fig. 35 was obtained from Photo Rameau & Fils in Etampes.)

47. The hall of Milly is briefly dealt with in a booklet by Georges Lasserre entitled *Les Rues de Milly* (Etampes, 1925), pp. 6 ff. For access to this booklet, a copy of which I could not otherwise have obtained, I am greatly obliged to the Comte de St. Périer of Morignon. The patent letter of Louis XI which authorizes the establishment of the market and the construction of the hall of Milly has also never been published, but an exact transcript of this important document has been transmitted to me by Mr. Raymond Geber, member of the Commission des Antiquités et des Arts de Seine-et-Oise, to whom I am deeply indebted for his kindness. I should also like to express my gratitude at this point to my friend Peter Harnden of Orgival, who was the first to draw my attention to this extraordinary group of mediaeval market halls.

48. Richard Krautheimer, "The Carolingian Revival of Early Christian Architecture," *Art Bulletin*, 24 (1942), 1–38.

49. I do not contend that this explains the entire problem of geometricity in mediaeval architecture, since intensely geometrical concepts appear in many other areas of mediaeval art, especially in the field of book illumination where they cannot be explained as an offspring of an architectural way of thinking. The problem of mediaeval geometricity hence has still another dimension and can only be solved in its full complexity when it is possible to define the general mental (or metaphysical?) concepts which underlie these other forms of geometricity. But it cannot be denied that in timbered frame construction geometricity and unit sequence have an immediate constructional rationale which will have to be taken into consideration in any future discussion of this problem.

50. "Et hanno più il modo da parer fatte di carta che di marmi." See Erwin Panofsky, "Das erste Blatt aus dem 'Libro' Giorgio Vasaris; eine Studie über die Beurteilung der Gotik in der italienischen Renaissance, etc.," *Städel-Jahrbuch*, VI (1930), 25–72 (cf. p. 43), translated into English in Panofsky's *Meaning in the Visual Arts* (New York, 1955), pp. 169–235 (cf. p. 189).

51. Cf. Panofsky, *op. cit.*, *Städel-Jahrbuch*, pp. 39–40, *Meaning in the Visual Arts*, p. 182.

52. The diagram reproduced in Fig. 42 (a construction of my own) is based on Berthold Vallentin's analysis of William's *Liber de Universo* in Gustav Schmoller, *Grundrisse und Bausteine zur Staats- und zur Geschichtslehre* (Berlin, 1908), pp. 41–120.

53. Erwin Panofsky, *Gothic Architecture and Scholasticism* (Latrobe, 1951), p. 45.

54. For Rusafa and Ruweha see Howard Crosby Butler, *Early Churches in Syria* (Princeton, 1929), pp. 145 ff., 161 ff. The reconstruction of St. Sergios basilica at Rusafa reproduced in Fig. 43 is taken from Friedrich Sarre und Ernst Herzfeld, *Archäologische Reise im Euphrat—und Tigris—Gebiet* (Berlin, 1920), II, 4, Fig. 133.

AMERICAN NOTES

CHARLES E. PETERSON, *Editor*
120 South Third Street, Philadelphia 6

NEWPORT UPSET

At one point on the SAH tour of Newport, Rhode Island, (August, 1953) your editor, wearing a black crepe-paper *yamilke* stood up in Peter Harrison's Touro Synagogue and read off the Reverend Ezra Stiles' 1763 description of the interior—including the "ark," a repository for the Scrolls of Torah on the auditorium's east wall.We thought the present ark was the original described by Stiles. So did Carl Bridenbaugh in *Peter Harrison, First American Architect* (Chapel Hill, 1949), p. 103, and Antoinette Downing in *The Architectural Heritage of Newport, Rhode Island* (Cambridge, 1952), p. 79.

Now, however, Mrs. Samuel Schwartz, SAH, of Paterson, New Jersey, who is working on the documentary history of the fabric, has gone back to the Stiles manuscript at Yale and found that the diarist had made a careful pen-and-ink sketch of this important feature on the margin of the text which was neglected by earlier publishers. We are very pleased to reproduce it here. Mrs. Schwartz in the following essay establishes the fact that Architect Harrison never saw the present ark, but that it was put up in 1828, sixty-five years later, as a part of a drastic restoration. To excuse the usual misdating of this important feature, we might say that the work of Harrison, an innovator, lies beyond the familiar handiwork of the typical American builder-designer and that the stagnation of Newport after the Revolutionary War probably accounts for the fact that this new ark of 1828 was already old-fashioned when built. It certainly doesn't reflect the new Greek Revival style just reaching the height of fashion in the more bustling centers of architectural progress.

TOURO SYNAGOGUE RESTORED, 1827–29

By ESTHER I. SCHWARTZ

Although we are apt to feel that it is only in recent years we in the United States have shown an awareness and appreciation of our architectural heritage, as early as in June, 1822, the *Rhode-Island American and General Advertiser* wrote:

JEWS IN NEWPORT

Sometime about the year 1690, a number of Jews established themselves at Newport (R. I.). By industry and commercial enterprise they became wealthy, and their numbers increasing, they built themselves a Synagogue. When the late Rev. Dr. Stiles was Minister at Newport, he maintained a pleasant and friendly intercourse with the leading members of the Society, and spoke favourably of their character and religious temper. This Society, by removals and deaths, has of late years been fast dwindling away, and the last of the nation has at last taken his departure. Mr. Moses Lopez, the death of whose brother we lately noticed, was the only surviving Jew on the island. We understand that he has lately removed to New-York, to enjoy the society of those of his nation who reside there.

We are told that the Jewish Synagogue at Newport is still standing, and with a little expense might be long preserved, as a "handsome specimen of ancient architecture." It is expected that a number of the Jewish Society will assemble at Newport, and perform worship at the Synagogue during the summer, for the purpose of holding possession of the building.[1]

Before this "handsome specimen of ancient architecture" was built and dedicated in 1763, religious services were held in the upper story of a house in Duke Street, corner of Washington Square, formerly Queen Street (Jewish religious services do not require a formal structure). The house was the joint property of Moses Lopez and Dr. Williams, and when the portion of the house belonging to Moses Lopez was sold and the house repaired, a section of a Hebrew book published in New Amsterdam was found

under the floor of the room where the congregation formerly worshipped.[2]

When the British captured Newport during the American Revolution, the majority of the population, Jew and Gentile alike, supporting the colonial cause, fled the town, and not enough Jews were left to continue religious services in the synagogue building. For a time after the Revolution the structure was put to other use. I quote from the tablet affixed to the building when it was designated a National Shrine: "Here in Newport, 1781–84, the Rhode Island Assembly met. During Washington's visit to Newport in 1781 a town meeting was held here. The State Supreme Court held sessions here at the period."[3]

Although remnants of the population returned, Newport did not again become the thriving town it had been before the Revolution. The members of the Jewish community that had returned gradually moved away and at the same time the above newspaper article was written the synagogue had not been used by an active congregation since the early 1790's and the title of the building had passed into the hands of the Shearith Israel Congregation in New York.[4] The historic structure stood empty and neglected, but not unthought of, for four months later, in October, 1822, Abraham Touro,[5] on his deathbed, made a bequest—probably the first ever recorded in the United States for the preservation of a building no longer in active use, leaving $10,000 to the legislature of the state of Rhode Island for the purpose of "supporting the Jewish Synagogue in that State." In 1823 we find listed in the Sessions Laws of the state of Rhode Island "Acts and Resolves to secure and appropriate the Touro Jewish Synagogue," perhaps the source from which Yeshuat Israel received the name by which it is commonly called today.

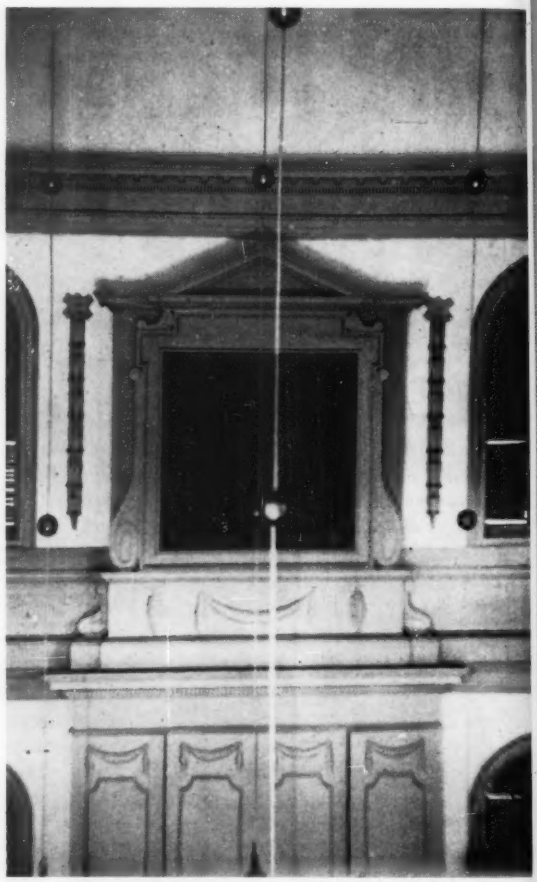
We can gather, in reading a letter written by Moses Lopez in New York to Stephen Gould in Newport, that although the money was accepted in 1823, nothing was done for some time. This was evidently a matter of no small concern to Rebecca Touro, sister of Abraham:

I shall be glad to know at the same time if the petition I sent last from Rebecca Touro has ever been presented to the Assembly. If it has not, she desires you not to delay it any longer as it appears very singular to her and indeed to us all, that the interest of the money bequeathed by her brother for the preservation of the Synagogue should be kept in their hands unemployed and that the building suffered to go to ruin, as Perry said it is fast decaying inside, contrary to the intent and meaning expressed in the testator's will.[6]

In all fairness to the General Assembly, there may have been more to the delay in fulfilling the terms of the Touro bequest than meets the eye, for Moses Lopez wrote to Stephen Gould in 1825:

I was not a little surprised that in your conversation with Mr. Welles you joined him in the opinion that it is best to let the council superintend the repairs of the Synagogue . . . That building is now considered as owned at present by the Hebrew Society in this city, and I am doubtful whether the trustees of it will tamely submit to the forced agency of the council to repair their own property without their consent.[7]

The matter was finally resolved, for, in a letter of September 27, 1827, from the Trustees in New York to the Town Council of Newport we read:



Touro Synagogue. Oldest known interior view (detail), 1872, showing present ark. (Courtesy American Jewish Historical Society)

We had perusal of a letter to Moses Lopez, he lately received from the appointed agent Stephen Gould, informing him you had made some beginning in the repairs of the Synagogue and from the description he gives of what has been done so far, we are perfectly satisfied and shall equally be so with anything you may think essential and necessary to do further without consulting us. Our object is to comply with the wish and desire of the Testator Mr. Touro in having the building and its premises (in which we include the burying ground) completely repaired in which good order they are to be kept in the future.[8]

From the report made by the Newport Council in 1828, it is quite evident that had it not been for the timely bequest by Abraham Touro, the Yeshuat Israel Synagogue would have been nothing but a memory, if indeed that, for the report tells us that the building was "in ruinous condition and not reparable but at great expense." The walls were in a state of rapid decay owing to the bad quality of the brick and the long period during which the building had been neglected. The plaster in the interior, which had originally been placed directly on the brick walls without furring, was crumbling to pieces, and the paneling and woodwork connected to the walls had rotted in many places. Nineteen hundred dollars had been spent from the Touro Funds for repairs and new fence, but the Town Council felt that an equal sum would be required to complete the repairs and to paint the building inside and out.[9]

From the detailed bills presented to the Rhode Island General Assembly in the years 1827–29 we can see that considerable work had been done on both the interior and exterior of the synagogue. The items listed bring questions to mind but there is no evidence that the replacements differed to any great extent from the original design.

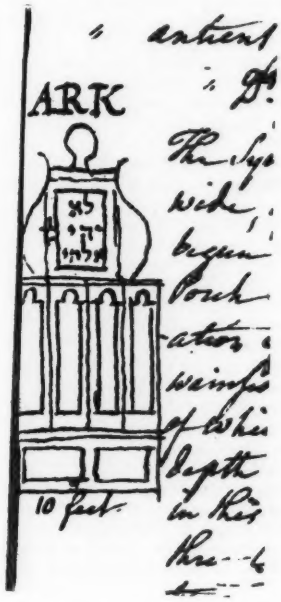
The ground was broken for the synagogue in 1759. Plans seem to have been known in advance to the Rev. Ezra Stiles who showed it on his map of Newport dated 1758.[10] We know of no contemporary views. The earliest sketch we have was engraved for *Harper's Monthly*, 1874. The field sketch may have been drawn before 1842, when the present granite and cast-iron fence was erected, for it illustrates a board fence, presumably the one mentioned in the 1824 report. The earliest interior view we have of the synagogue is the photograph taken in 1872 for the Rev. Jacques Judah Lyons.[11]

In my search for data concerning the synagogue, I read the original manuscript material wherever possible, realizing that items seemingly of little importance could have been overlooked by historians and editors. With this in mind I consulted the Stiles manuscript collection at Yale.[12] Ezra Stiles' account of the dedication of Yeshuat Israel Synagogue, December 2, 1763, has been quoted so often that my expectations were little in that quarter. To find a sketch of the ark on the margin of his notes that had never been mentioned was surprising enough, but to find it so different from the ark that had so long been accepted as the original was a shock! I quote Ezra Stiles:

> The Front representation of the holy of holies, or its Partition Veil, consists only of wainscotted Breast Work on the East End, in the lower part of which four long Doors cover an upright Square Closet the depth of which is about a foot or the thickness of the Wall, & in this Apartment (vulgarly called the Ark) were deposited three Copies & Rolls of the Pentateuch, written on Vellum or rather tanned Calf Skin.[13]

When we stop to realize the detail with which the Rev. Mr. Stiles described the plan of the synagogue and the columns supporting it, and his mention of the fact that the back and breast of the seat for the Parnas are "interlaid with Chinese Mosaic Work,"[14] and then read again that the "Front representation of the holy of holies, or its Partition Veil, consists *only* of wainscotted Breast Work on the East End, in the lower part of which four long Doors cover an upright Square Closet the depth of which is about a foot or the thickness of the Wall," it seems obvious (with a clarity born of hindsight) that this certainly is not a description of the striking ark we see today.

The ark of Ezra Stiles' sketch seems much more in keeping with the simple synagogue structure than the present



Touro Synagogue. The first ark. Ezra Stiles diary, Dec. 2, 1763. (Courtesy Yale University Library)

ark, beautiful as it may be.[15] The Hebrew wording on the sketch is an abbreviation of Exodus 30:2, "Thou shalt have no [other] Gods [before me]." Whether this was the entire inscription on the ark or whether the Rev. Mr. Stiles, limited in space, intended the abbreviation to represent the Ten Commandments, we cannot tell. The inscription could have been carved in the wood or inlaid in the same fashion as the mid-eighteenth-century ark taken from the private synagogue of Joseph Simon of Lancaster, Pennsylvania.[16] I am inclined to believe that the painted canvas now about the ark is the one mentioned in the bill to the General Assembly of Rhode Island: "Oct. 1, 1828; To Cash paid

Ben B. Howland for Painting piece for commandments $12.00."

The present ark has been accepted as the original and has been associated with the synagogue for so many years and is so lovely in its own right, that surely it can be accepted as a rightful part of the synagogue and is far to be preferred, to my mind, to any reproduction of the original, much as I regret the radical alteration made in the early nineteenth-century program of preservation.

1. Vol. XIV (June 14, 1822). Collection Ray Martin.
2. Manuscript collection Rev. J. J. Lyons, American Jewish Historical Society. Lyons tells us, too, "This relic was presented to me by N. H. Gould, Sept. 17, 1872."
3. For further details of the period, see Morris A. Gutstein, *The Story of the Jews of Newport* (New York, 1936), and Jacob Rader Marcus, *Early American Jewry* (Philadelphia, 1951), I, 102–157.
4. David and Tamara De Sola Pool, *An Old Faith in the New World* (New York, 1955), p. 422.
5. Abraham Touro was son of Rev. Isaac Touro, Hazzan of the synagogue at the time of its dedication.
6. Lyons Collection, Vol. II, *Publications of the American Jewish Historical Society*, No. 27, p. 433.
7. *Ibid.*, p. 440.
8. From the original copy in the Rhode Island State Archives.
9. Report to the General Assembly of the State of Rhode Island, Vol. 8, No. 79.
10. In the Redwood Library, Newport, Rhode Island. The symbol locating the future synagogue is placed at an angle to the street the way it was later built.
11. Lyons Collection, American Jewish Historical Society.
12. Yale University Library.
13. From the manuscript account.
14. The Parnas' seat as it stands today has a decoration of applied strapping. This may be the "Chinese Mosaic Work" (if this section is original, and it is to be hoped that it is, since major portions were not affixed to the wall), or perhaps with paint removal, wood inlay or a painted decoration will be found.
15. Letter from Moses Lopez to J. Simson and S. Judah in New York dated Newport, July 25, 1762.
"As we have now contracted with Workmen, who are actually at work to complete the Hechal [ark], Tebah [the reading platform in the Synagogue] & benches for our Synagogue, we are in great hope same will be finished by Rosasanh."
16. In the collection of the American Jewish Historical Society.

DEPARTMENT OF OBNUBILATION, 1770

Lawrence C. Wroth at the John Carter Brown Library, Brown University (once the Rhode Island College), sent us a transcript of the interesting letter from Philadelphia published below. The subject of this inquiry was the proposed "College Edifice" built at Providence 1770–1772 and now known as "University Hall." Its design is generally attributed to Robert Smith of Philadelphia (*c.* 1722–1777) because of the resemblance to Nassau Hall at Princeton (built 1754–56). The structure still stands and was restored in recent years by Perry, Shaw and Hepburn of Boston.

Little is immediately available about Anderson, but we predict that you are going to hear a lot more about him. The reference "in our papers of 22d Feby," however, has not yet been located. We would be glad to have further information about this colonial architect, who was an infinitely better designer than speller.

To

The Corporation of the College in Road-Island Government
at Providence

Tuesday 13th
March 1770 or elsewhere

* *

Gentlemen

From the Acc^{ts} in our papers of 22^{d} Feby—find you are come to a resolution of Building at Providence prosumes therefore to tender you my Services, as Architect & Superintendant for that purpose—(if not inguaged) I must confess, my mode of application deviates from ye formalities customary on such occations, such as letters of recommendations &c—for my part think it needless—after informing you of my Appointment as an Architect & Superintendant to the New State House at Annapolis—as well several private edificis particularly one of a grand & Eligant Construction for Jos Gallaway Esq Speaker of ye House of Assembly & being regularly bread to those Sciences—& ye only one upon ye Continant—Prosumes may be of eaquel advantage—For nothing being more desirable & Satisfactory to a Society of Gentlemen then the appropriateing an Accumulated Sum to ye best advantage—(Particularly in Building that may Reflect Honour to ye founders & hand down their Names to Posterity) rather than ye erecting an unmeang Ildigested Plan which not only disgusts the Eyes of every beholder—but raiseth a Contempt for the pretended abilities of the Artist.—Alas I am sorry to find so many Publick Buildings already erected upon ye Continant without Taste or Genius—w^{ch} has buried many Thousands of pounds Subscribed with that freedom of Generosity only eaquel to the Americans—I Prosume (from my practical knowledge of the Science as well as my knowledge of several Courts of Europe)—shall not be found Wanting in the Art of pleasing my Imployers & to serve them as well to Establish my Name upon ye Continant—as those were my Motives that Bro^{t} me to this Country added to my natural Desire of raising the Obnubilated Science to ye highest pitch of Glory on this Continant—If my Offers meet your Approbation—shall in Consequence of a line directed to me attend your appointment—till then remains

Gentlemen Your Hum Ser^{t}

Philadelphia 14 Mar 1770,

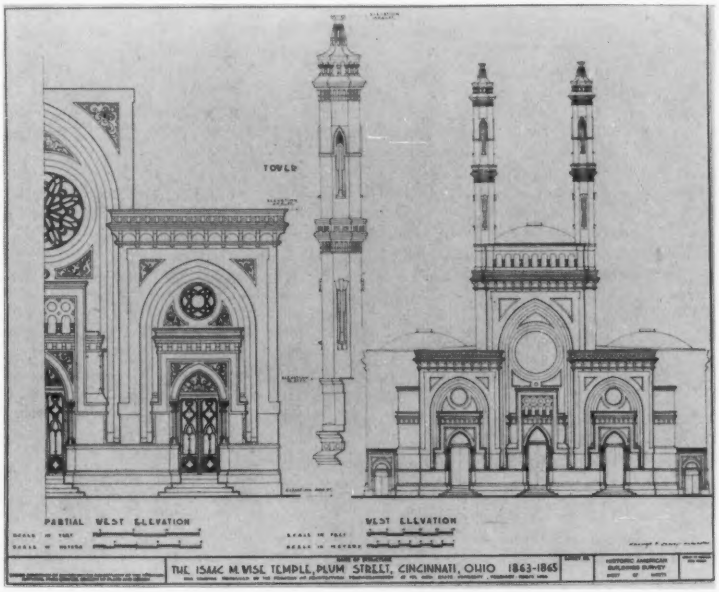
Jos Horatio Anderson
Architect at Philadelphia

PHOTOGRAMMETRY, THE MAGIC SCAFFOLD

We present here new HABS drawings by George F. Erssey of the Plum Street Temple in Cincinnati made by the Engineering Experiment Station of Ohio State University under contract with the National Park Service. This is one of the first American structures ever recorded this way, and the savings of time, scaffolding, etc., plus the real accuracy of the result, are striking. (See "American Notes" for December, 1957).

Of this structure Perry E. Borchers writes:

The architect is James K. Wilson, first President of the Cincinnati chapter, American Institute of Architects. Dates of construction 1863–1865. Described at the time as an "Alhambra Temple of thirteen domes." Cast-iron columns between side aisles and nave penetrate the nave arcade to support a cast-iron beam carrying the clerestory wall above. Domes of side aisles, as seen beneath the roof, are of plaster upon wood lath. The roof is a frightening place in a good breeze. The building is known officially as the Isaac M. Wise Temple and is the mother church of Reformed Jews in this country.



Historic American Buildings Survey drawings of the Isaac M. Wise Temple, Cincinnati, made by George F. Erssey with the use of photogrammetry.

BOOKS

PAUL F. NORTON, *Editor*
The Pennsylvania State University

Otto Georg von Simson, *The Gothic Cathedral* (New York: Bollingen Foundation, pub. by Pantheon Books, 1956), 307 pp., 40 plates, 10 figs. $6.50.

Although within the last decade a considerable amount of literature has been published on Gothic architecture, and the Gothic cathedral in particular, Simson's book proves that still something essentially new and important can be said about this subject. In fact Simson contributes a basically new approach to the widely ramified problems raised by the Gothic cathedral. Most scholars heretofore have defined the Gothic cathedral either from a formal or iconographical point of view, and have determined its place in history from the position of an outside observer. Simson absorbs the ideas of the mediaeval man to such an extent that they become a personal experience almost to the point where by means of empathy the author seems to take part in the event of that period. Yet sometimes the reader is faced with the difficulty of keeping personal experience and historical facts clearly apart.

To explain the origin of the Gothic concept expressed in the cathedral Simson raises two questions in his introduction. The book is devoted to answering these questions.

1. What was the vision out of which the cathedral was born?
2. What was the exact connection between this vision and the Gothic form?

He sees in the Gothic cathedral a sanctuary which is the threshold to Heaven and which represents at the same time the Kingdom of God on Earth. For him the cathedral is a "mystical vision of harmony that divine reason has established throughout the Cosmos" (p. xviii), and in this religious experience of the mystical vision, according to Simson, originates the Gothic form. In order to let his readers participate in his experience he retraces the process by which the mediaeval man, who is inclined to symbolic interpretation, transforms his vision into architectural form. This he con-

siders to be most successfully achieved in the three cathedrals—St. Denis, Sens and Chartres. Simson gives a broad setting to the artistic and religious problems by touching upon the history of social life, its economic achievements and religious events in order to clear the way for a better understanding of the Gothic mind in its willingness to accept the authority of the religious doctrine.

Simson divides his book into three parts—1. Concept of Order; 2. The Birth of the Gothic; and 3. The Consummation. In the second part he is preoccupied with Suger at St. Denis and the School of Chartres. His chief considerations in defining the sources of the new style are the mystical experience of light together with the contribution which was made by the asceticism of St. Bernard of Clairvaux and the role which the classical measurements and proportions played in the Christian-Platonic School of the twelfth century. The development of this new style of the Gothic form is marked by the increasing clarity with which the geometrical principle is applied. Geometry, one of the disciplines of the quadrivium of the *Artes Liberales* developed into an aesthetic concept based on the Augustinian treatise "De Ordine" and the Boethian treatise "De Musica," in which the "anagogical function" of geometry leads the mind from the world of appearance to that of contemplation of the divine order. Simson goes on to explain how this order is based on the Pythagorean Principle of "Perfect Ratio" that rules the cosmos. He then elaborates at length on the aesthetic aspect of the two movements which dominated the twelfth-century thinking, the Platonic cosmology and the spirituality of Bernard of Clairvaux which were responsible for the creation of Gothic art. In the Cathedral School of Chartres was a group of theological scholars who established a school of philosophy based on the Platonic cosmology as laid down in the *Timaeus*. Simson emphasizes in particular the great importance of the second movement in twelfth-century France for the origin of the Gothic style, especially the architecture, namely, the Cistercian movement with Bernard of Clairvaux as its spiritual head. Bernard's artistic reform had led to an austere aestheticism which finds its expression in the purity of form and above all in the perfection of the architectural proportion. Its impact is felt, according to Simson, in the architecture of Chartres as well as in St. Denis where Suger, the great abbot, was greatly influenced by Bernard of Clairvaux, his personal friend.

Next to the mystical numbers and proportions applied by means of geometrical schemes, an equally characteristic feature of Gothic architecture is the mystical luminosity. Here Simson deals with the aesthetic aspect of light and its effect caused by stained glass windows, as well as with the radiant and glittering light of precious stones and metals (Bonaventura). It is not so much the physical light Simson is concerned with, but in particular the divine that "penetrates the universe and illuminates the intellect for the perception of truth." Here Simson quotes (p. 53 n.) Johannes Scotus Erigena, the Dionysian commentator, and he embarks on a long and detailed study on the definition of light in epistemology and its metaphysical quality in the writing of Dionysius the Areopagite in connection with the "logos" of the Gospel of St. John. The interest of the twelfth century in Dionysius the Areopagite became particularly important because of his association (right or wrong) with St. Denis, whose veneration has led to such an extensive cult. According to Simson, "the mystical light has played a role of equal importance to the influence of the Platonic-cosmological system in the birth of Gothic." At that point Simson introduces a new observation into the discussion, which has been so far mainly theoretical, concerning cosmology and metaphysics. It has long been recognized that geographically and chronologically Gothic architecture started in the twelfth century on French soil, and according to some scholars, including Simson, its place of origin is more specifically the Ile-de-France. But it always was looked upon as a gradual transformation of the Romanesque style in architecture; the first signs of it have been found in some churches of Normandy and Burgundy. Simson quotes here among others Lefèvre-Pontalis who opposed the theory of gradual transition from the Romanesque to the Gothic style, and has seen the latter rather as a revolt against the Romanesque. Simson, who stresses this theory, sees as the reason of this challenge the political movement that developed alongside the religious thought of that time. Ile-de-France was the domain of the Capetian monarchy and among the three political representatives of this Province at that time, Bishop Henry of Sens, Geoffrey of Chartres and Suger of St. Denis, the latter was doubtless the most powerful and successful as a diplomat and political counsellor, as well as a writer and artistic adviser. He made the Royal Abbey of St. Denis a political and artistic center, where he combined the Benedictine reform with the political aspiration of Louis VI, whereby Church and Monarchy became inseparable. In St. Denis the royal crown was deposited and the feast of the relics made the Abbey a place of pilgrimage. Simson sees in Suger the spiritual creator of Gothic architecture, and basing his views on the theory of Boethius and Alan de Lille, he sees in Suger the *architectus theoreticus* who provided the aesthetic and symbolic ideas, while the technical work was executed by the masons. Suger's own writings, which are impregnated by Platonic-Augustinian-Dionysian theories, are the main source by which one comprehends his approach to architecture as a religious experience. For this reason Simson deals with these writings at length and with great subtlety. Simson tries to elaborate on Suger's ideas that St. Denis is the source of what amounts to an artistic revolution, where the architectural system becomes but the frame for the stained glass decoration. These stained glass windows were not conceived as openings in the wall, "but as translucent surfaces to be adorned with sacred paintings" (p. 122). But here Simson himself has to admit that, although a close connection exists between the Dionysian metaphysical light and the Gothic luminosity, "such analogy does not yet reveal the creative process leading from one to the other," and he goes on to say that "still less is Gothic the only possible monumental illustration of that metaphysics." But he believes that one "can trace the influence of the Dionysian thought in that particular transformation of Romanesque models by which Suger and his assistants created a new style" (pp. 106 f.). Granting that the Dionysian light theory revived by Hugo of St. Victor had inspired Suger to conceive of a vast program of stained glass decorations, it does not, however, explain why this light experience had to be expressed in *Gothic* form. Furthermore, although Simson succeeds well in enumerating all available evidence—the aesthetical-artistic, as well as cultural-religious, the political and economic—the book does not explain why these new influences, developments, challenges and revolts found their expression particularly in the *Gothic* style characterized by pointed arches, ribbed vaults, diagonal piers, flying buttresses and so on.

It is therefore theoretically conceivable that the Dionysian mystical light experience could have found its expression also in another style, providing similar conditions prevailed.

In his last chapter—The Cathedral of Chartres—Simson touches upon the Gothic style as an architectural concept. Having introduced the reader to the historical and scholastic developments of the Cathedral School of Chartres, where men like Thierry of Chartres, John of Salisbury, and Peter of Roissy, as well as Grosseteste were teaching the significance of the quadrivium, and where the influence of Villard de Honnecourt was felt, the question is raised whether these scholars contributed to the building of Gothic architecture according to the "true measurements." The restriction that was imposed by retaining the old western façade of Chartres Cathedral coincides with the "perfect proportion" in which the new cathedral was built, and therefore it became somewhat different from other contemporary cathedrals. Simson expresses this difference in the following aesthetic evaluation: in Chartres Cathedral the visual proportions react like musical harmony. He says it is not the mathematical proportion which is used in every mediaeval architecture, the exactness by which it is executed, it is the aesthetic application of the division and subdivision in proportion, dependant from one part upon the other, that makes Chartres a unity and with this the purest Gothic cathedral. To make his point still more clear, he compares Chartres with Hildesheim and concludes that in contrast to the church of St. Michael, which he considers to be built in simultaneous har-

mony, Chartres is executed in what he calls a consecutive harmony. Or, to express the same idea in musical terms, Simson uses for the proportions of St. Michael's in Hildesheim the term "polyphonic," whereas in the Cathedral of Chartres he calls the proportions "symphonic." Here Simson doubtless becomes partial to Gothic proportions when he claims that St. Michael's fails fully to assert itself aesthetically, because it does not comply with the law of harmony as established by the Gothic style, which he equates with "geometrical functionalism," distinctly different from the Romanesque style.

Attached to Simson's text is an Appendix by E. Levy, "On the Proportions of the South Tower of Chartres Cathedral."

In summary, of the two questions which Simson raises in his introduction, the first, about the mystical vision out of which the cathedral was born, is answered with great circumspection, showing a profound knowledge of the literary sources and comprehension of the religious and cultural problems; whereas the second question, which is concerned with the connection of mystical vision and Gothic form, being more speculative, leaves room for different theoretical interpretations with regard to the origin of the Gothic form. But whatever the controversial points may be, Simson's book shows a great unity of concept and a mastery of the literary and artistic material which make the reading very stimulating. It is not primarily written for the architectural historian whose concern with the cathedral is formal analysis of the architecture and the solution of structural problems. This book rather belongs to that category of writings that is termed "art history as history of ideas" (Dvořak), the chief interest of which is culture in the broadest sense as a background to art history and its related branches.

J. WEITZMANN-FIEDLER

James P. Noffsinger, *The Influence of the Ecole des Beaux-Arts on the Architects of the United States* (Washington, D.C.: Catholic University of America Press, 1955), 123 pp.

This small book gives a full and interesting account of how many and which Americans attended the Ecole des Beaux-Arts in Paris to study architecture—a complete listing of the Ecole-trained men, French as well as American, who taught according to its principles in the American architectural schools.

The author states that the Ecole des Beaux-Arts exerted an influence on the architects and on the architecture of the United States, but he does not say what this influence was. He says this influence waned, but does not explain how or by what it was superseded.

It is true that after the influx into this country of men trained by Beaux-Arts principles its architecture changed radically; this training inculcated logical thinking, new ideas of monumental planning and composition. Beaux-Arts study was an education in taste, the opening of the eyes of the student to beauty of form; it promoted an interest in the architectural forms of the past—leading students with little originality to copy those forms; it greatly improved the standard of draftsmanship in the schools and in the offices; and it greatly stimulated the use of competition—in all of the teaching, and as a basis for award of many public and semi-public buildings.

This French academic system of thinking and training was displaced about 1935 in a few schools at first, but before many years in all American schools by a scheme of training, German in origin, based on functionalism of use and structure, and an avoidance of any type of competition in the schools and in practice. This training which placed no value on the study of historical precedent, brought about a retrogression in the quality of draftsmanship in the average office.

Mr. Noffsinger quotes a Beaux-Arts graduate to the effect that the Paris-trained men caused a veritable renaissance of American art, a raising of the standard of taste in what had been a rather provincial civilization.

With the growth and development of a civilization based on the use of ever more ingenious machinery it was inevitable that the teaching of architecture and its practice in offices would change radically. It is regrettable that good aspects of the training were lost in this process, in particular the stimulation of competition and the study of harmony of proportion.

JOHN F. HARBESON

Benjamin W. Labaree (ed.), *Samuel McIntire, A Bicentennial Symposium, 1757–1957* (Salem, Mass.: Essex Institute, 1957), 118 pp., 65 figs. $4.00.

It would appear that after the exhaustive contributions of the late Fiske Kimball (his many articles which appeared in the journals and periodicals during the 1930's, his excellent life in the *Dictionary of American Biography*, 1933, all crowned by his monumental *Mr. Samuel McIntire, Carver of Salem*, 1940) another book on the subject would be superfluous, but such has not proved to be the case. This, I believe, is for two reasons, the fascination of McIntire's work and the quality of the little volume under review.

To the professional, McIntire is an intriguing transitional figure, falling between a traditional carpenter-housewright (as was his father, to whom he was apprenticed) and a foreign-trained architect (as was Bulfinch, who greatly influenced his later work). He was an untraveled, humble, craftsman, a self-taught architectural draftsman, familiar with the best available source books, possessed of great industry, imagination, taste and a delicate sense of proportion. "All art is proportion," wrote another resident of Salem, the Orientalist, Ernest Fenollosa, a century later, "under technical conditions which vary"—and such it is. To the layman, uninterested in technology, sources and influences, it is the unconscious appreciction of just proportion and the delight in the obvious brilliance, refinement and delicacy of his architectural efforts—all in Salem, but for a single exception—which appeals. The same might be said for his carved eagles, figureheads, furniture and fences. And to all of this must be added the comforting and quiet quality of traditionalism. Though his work is always fresh, McIntire was no great innovator. His excellence was achieved within the bounds of a well-ordered system.

How fortunate was Salem that in her most prosperous period, directly after the Revolution, when her ships sailed the Seven Seas and her merchant princes built, there was such a man of "modest and sweet Manners . . . distinguished for Genius in Architecture, Sculpture, and Musick" available—and employed—for the virtual rebuilding of the city which, happily still preserves its pristine beauty!

A symposium was held at Salem under the auspices of The Essex Institute last May to commemorate the two-hundredth anniversary of the birth of this builder-architect. Papers were read, houses inspected and music heard, for music was the avocation of McIntire, the owner of an "elegant Barrel Organ." "Since no collection of papers honoring Samuel McIntire would be complete without a contribution by the late Fiske Kimball," the editor of these papers has wisely included the account of the life of the architect, the first twenty-nine pages from the sumptuous volume which appeared in 1940, published like this one by The Essex Institute. This opening chapter is followed by a scholarly account of seventeenth- and eighteenth-century architectural practices by Abbott Lowell Cummings, Assistant Director of the Society for the Preservation of New England Antiquities. Dean A. Fales, Jr., of "Winterthur" contributes an article on McIntire's carved furniture, which in Kimball's opinion was "executed with a brilliance which has never been surpassed in America," illustrated by superb examples from the Henry Francis duPont Collection. A chapter on figure carving, complete with check list, by Nina Fletcher Little, follows. Mabel Munson Swan, to whose researches all scholars in the field are indebted, presents a learned paper based solidly on diaries, accounts, bills, advertisements and other contemporary documents. An essay as to McIntire's place and influence in post-Colonial America by Oliver W. Larkin of Smith College brings these highly informative papers to a brilliant conclusion. It is followed by a nine-page selected bibliography. The worst that can be said about these individual papers is that they are, excusably,

slightly repetitive. Combined, however, they form a necessary and up-to-date adjunct to all previous work. The book is an important scholarly tool and a layman's delight.

The little volume was, appropriately, printed in Salem; the illustrations were reproduced in Meriden, Connecticut. The format, the quality of paper and type, and the excellence of the illustrations leave nothing to be desired; it is in character with the work of the man it memorializes—trim, refined, elegant, dignified—and beautifully proportioned.

THEODORE SIZER
Yale University

John Szarkowski, *The Idea of Louis Sullivan* (Minneapolis: University of Minnesota Press, 1956), 163 pp., 94 illus. $10.00.

One's first impression of this book is that it is merely a handsome picture-book with superb photographs of Sullivan's buildings interlarded with a few extraneous views of people and city streets, the whole accompanied by a miscellany of apparently irrelevant quotations from a score or more of authors ranging from Ward McAllister to Rudyard Kipling.

But it is far from a hastily-contrived anthology of snapshots and quotations. To the person who reads between the lines and the pictures, or more properly senses the unison between them, it emerges as a new kind of experience in words and images. John Szarkowski has produced what I believe to be the most deeply-felt, the most profound, and the most moving insight into the spirit of Louis Sullivan that has appeared since Sullivan's own most eloquent words were written.

The book makes no pretense at complete documentation—indeed fewer than a dozen of Sullivan's buildings are shown, and not all of these might be regarded as his best. It does not tell the story of the man's life, except for a ten-page (but very good) "Profile." It tells little of the times in which he worked, except elliptically, through the words of others. The author stays always in the background, indeed the preface he entitles simply "Photographer's Foreword."

Yet emerging from the apparently casual juxtaposition of text and picture is a subtle and powerful discovery of what Louis Sullivan's buildings meant as works of art and as documents of American life. Though Szarkowski almost never states his meaning in words, one senses the range of emotional impact that these buildings have made on him—from triumph in the sumptuous splendor of Sullivan's most magnificent ornament to a sociological rage that these buildings must fight against the shabby vulgarity of America's cities. Some pictures, indeed, like that of the sidewalk salesmen with tawdry jumping toys in front of the incomparable strength and richness of a single pier of the Carson-Pirie-Scott Store seem an epitome of Sullivan's whole life. Equally biting in a weird surrealist way is the picture of two of the ornamental panels in the Auditorium with the dried corpse of a bird on the ledge below them. One can almost sense the silent darkness of the vast dilapidated hall that Galli-Curci once filled with sound to match its golden brilliance.

It is necessary to understand how Szarkowski conceived his job of picture-taking. "As I began to work," he says, "I found, to my own surprise, that I was seeing this building not with the decorous disinterest with which a photographer is supposed to approach a work of formal architecture, but as a real building, which people had worked in and maimed and ignored and perhaps loved, and which I felt was deeply important. I found myself concerned not only with the building's art-facts but with its life-facts." These are new pictures of half-century-old buildings, a fact that gives them scale and contemporary reality, but also a curious timelessness. People and automobiles and clocks and wires, and above all the sordid clamor of advertising signs, make you see these as real buildings, sometimes overwhelmed, sometimes still triumphant in their existence. Indeed Szarkowski's book is as much a commentary on the modern city and modern civilization as it is on Sullivan's architecture. Yet you come to realize that these same sordid, vulgar, cheap surroundings were then, when Sullivan worked, just the same, and part of what he contended with and what his life was all about.

The text passages, Szarkowski explains, are "less to explain or evaluate than to capture the mind and spirit of the man and the time and the place." While some thirty of these are well-chosen quotations from Sullivan's writings, the others range through a score of other authors, including such men as Walt Whitman, Frederick Jackson Turner, Frank Lloyd Wright, Andrew Carnegie, Frank Norris, Henry Adams, Hamlin Garland, and Thorstein Veblen. These passages are very carefully cut and tailored to create a mood for seeing the pictures facing them, and they lead to unsuspected discoveries of what wrath, irony, poetry, understanding and sympathy can go into the making of a picture. No one can read Mr. Ward McAllister's condescending snobisms about Society without realizing something of the world for which the Auditorium was built, how it reflected that world and yet transcended it.

Each building is seen in what the movie-producers would call a sequence—a series of photographs and text passages that have their own particular meanings in the unfolding of the total drama. Those on the Garrick Theatre and the Chicago Stock Exchange are particularly telling episodes.

This is a new kind of book and a new kind of history. Those who see in it just another descriptive picture-book will miss the essence, for Szarkowski has brought new understanding of the idea of Louis Sullivan with passion and insight and deep conviction.

HUGH MORRISON
Dartmouth College

Henrique E. Mindlin, *Modern Architecture in Brazil* (New York: Reinhold Publ. Corp., 1956), 256 pp., illus. $12.50.

This spring the Presidential Palace by Oscar Niemeyer, the first public building in Brasilia, the new capital-to-be of Brazil, will be opened; this city of which not even the plan had been established two years ago when Henrique Mindlin was putting the finishing touches to his book. That indicates the pace at which architectural history is made in Brazil! The premiated plan for Brasilia is the work of Lúcio Costa. Costa is at once the father of modern architecture in his homeland at the age of 56, thanks to his responsibility for the Ministry of Education and Public Health in Rio de Janeiro, designed in 1936 and built in 1937–43, and the protector of its architectural patrimony, in his position as director of SPHAN, the governmental agency that has charge of historical monuments.

The episode of the adoption and modulation of the forms of European modern architecture in Brazil is so important internationally that we may be grateful Mindlin has not, as he originally intended, restricted his account to what has been erected since the publication of *Brazil Builds* by Philip L. Goodwin and G. E. Kidder Smith in 1943, but has provided a generous range of examples extending back a full thirty years. In his introduction, moreover, he has at least sketched the earlier history of Brazilian architecture—for the first time in English, I believe—contrasting the Portuguese colonial tradition with the French academic tradition imported with Grandjean de Montigny in 1816. The revival of interest in colonial architecture in the 'twenties was not an obstacle to the reception of new ideas brought by Le Corbusier and others from Europe but rather helped to prepare the way for the rapid and successful acclimatization of the new European architecture in Rio and São Paulo.

Despite the striking impression the Ministry of Education Building made on the outside world, rising to completion in the war years when building production had all but ceased throughout the Western World, this masterpiece—for it remains such—of modern architecture is often misattributed. It is not the least virtue of Mindlin's historical conscientiousness that he gives a more accurate picture of the early days of modern architecture in Brazil than has previously been generally available.

Gregori Warchavchik, a Russian-born architect trained in Rome, built the first modern house in Brazil at São Paulo in 1928, the year before Le Corbusier first lectured there on his way home

from Argentina and Uruguay. Neither this nor the other houses Warchavchik built in the next few years are remarkable except for their date and they pass almost unnoticed today. Next appeared Costa. The educational revolution that he initiated at the National School of Fine Arts in Rio in 1930, when he installed Warchavchik as director of the Fourth Year in Architectural Design, was abortive. But his leadership was accepted by a majority of the students, headed by Jorge Machado Moreira. Political troubles slowed down public building activity in the early 'thirties; but in 1935 Vargas's Minister of Education Gustavo Capanema made, in Mindlin's words, "the personal decision that has contributed most to the development of modern architecture in Brazil," supported by the Andrades, reputed local critics, and (rather surprisingly) by Mussolini's architect Marcello Piacentini. Ignoring the premiated competition projects for the Ministry that had been prepared by various academic architects, Capanema asked Costa to make a wholly new design. Costa formed a group that included Carlos Leão, Moreira and Affonso Eduardo Reidy, to which were later added Niemeyer and Ernani Vasconcelos. Their first scheme, submitted in May, 1936, was already distinctly Corbusian, but then Costa suggested that Le Corbusier himself should be brought to Rio as a consultant on the building and for a month the European architect worked closely with the local group as well as giving a series of public lectures. The final plans, as submitted by the group in January, 1937, certainly owed a good deal to Le Corbusier, but the credit for the building as it was erected in the next six years belongs to Costa and his five associates—not, as is sometimes supposed, to one of them alone. However, Costa did resign as director of the group in 1939, after construction was well under way, and the others then chose Niemeyer to succeed him. Thus the building may most properly be attributed to Costa, Niemeyer and others, with Le Corbusier as consultant.

Before the Ministry was actually begun, however, other buildings had gone up that illustrated as definitely, if less dramatically, that the dawn of a new day in Brazilian architecture had come. The Brazilian Press Association Building with its fixed sun-breaks, for which the brothers Marcelo and Milton Roberto won the competition in June, 1936, the very time of Le Corbusier's call to consult on the Ministry, and Niemeyer's Day Nursery with its movable sun-breaks, completed the following year, introduced before the Ministry was even begun new forms of sun-control such as Le Corbusier had admittedly first proposed for an apartment block in Algiers in 1933. Other significant events were the winning of the competition for the Rio Seaplane Station in 1937 by Attilio Corrêa Lima and of the competition for the Santos Dumont Airport by the brothers Roberto, also in 1937, both of which remain notable features of the Rio seafront—the smaller was completed in 1938, the larger in 1944. The competition for the Brazilian Pavilion at the New York World's Fair was won by Costa in 1938. The executed building, on which Niemeyer worked as collaborator at Costa's request, brought to the attention of the outside world the special virtuosity of the Cariocan School some years before the Ministry was finished. It also helped to focus that attention somewhat too exclusively on Niemeyer.

Those of us who have, in a sense, lived the history of modern architecture for the last 25 or 30 years need to be reminded from time to time how much more complex is its real story than the simplified legends that have gradually become accepted as fact. Academic scholars have as yet hardly got much beyond the Art Nouveau in their re-examination of the successive movements which have given us the tradition of which we are heirs and participants. Henrique Mindlin is not a historian; he is one of the leading architects of Rio and São Paulo; his skyscraper that will soon rise on the site of the Avenida Hotel in Rio is to be the tallest in the city and the first to be built with a steel instead of a ferro-concrete skeleton. A man of unusual generosity of spirit and critical balance, he has produced a book that is a model of its kind. Projects are illustrated apart from executed work; executed work is grouped by categories: residential (including housing projects), public buildings, and commercial and business buildings, with a final section devoted to city-planning and landscape design. Most buildings are shown in two-page spreads and for all of them plans to scale are given, and frequently sections and sometimes elevations as well. An index by architects gives their dates and places of birth—a dozen were born in Europe, although in many cases of Brazilian parents—the schools in which they were trained, and their present addresses. The coverage of certain extensive schemes, such as Reidy's well-known housing development at Pedregulho on the outskirts of Rio—ten pages—and Niemeyer's less frequently published staff housing for the Aeronautical Technical Center near São José dos Campos—six pages—is notably generous and provides, as books of this nature rarely do, sufficiently complete visual information to make comprehensible these complex projects.

Foreign visitors to Brazil have complained with some justice of the lack of low-cost housing and of new school buildings. The excellent work in these categories illustrated in this book makes evident that Brazilian architects have not altogether neglected them, even if economic and political factors outside their control have limited their employment for such work.

As elsewhere in the world of the 1950's, it is by no means certain that the newest directions of the last few years have all been well chosen. The later business buildings by the Robertos do not have as clean and direct a character as their Instituto de Resseguros do Brasil Building of 1942. The excellence of Costa's work of the 'forties makes it regrettable that he has hardly built at all in the last few years. And, to an extent not so evident in this carefully selected roster of modern buildings as to visitors to Brazil, some of the happiest early ideas of the leaders have now become vulgarized into clichés that builders employ *ad nauseam*.

Urbanism has not so far been the *forte* of modern Brazil; but even in early colonial days there was rarely in Portuguese settlements such characteristic order as was imposed on Spanish ones. A positive virtue of the best present-day Brazilian schemes, however, is their respect for the value of historic monuments. The frontispiece of this book, with the glazed slab of the Ministry of Education rising behind a splendidly maintained colonial church, well illustrates the breadth of Costa's tastes and capacities as sponsor of the new and protector of the old. Reidy's project for the development of the Santo Antônio Hill district in Rio, preserving the Santo Antônio and the Santa Teresa Convents and also the impressive eighteenth-century aqueduct known as Os Arcos, is also exemplary in this respect.

No book can do real justice to the Brazilian settings which are so often breathtaking in their drama; but Mindlin properly concludes with some illustrations of the gardens of Roberto Burle Marx, collaborator from the first with most of the architects of his generation. In them a good deal of the luxuriance of Brazilian nature and, in the Monteiro garden at Corrêas near Petrópolis, even something of the splendor of the background scenery can be appreciated. Although cynics have said—and Brazilians are often very cynical—that the natural beauty of Rio is so great that even the architects can't ruin it, the foreign visitor is more likely to feel that it is the example that nature provides which has, more than any other aspect of the Brazilian environment, stimulated the best architects to autochthonous achievement. Their style is very remote indeed from Frank Lloyd Wright's; but they seem to have something of his capacity to pick superb sites and to rise to the challenges that these offer.

So admirable is Mindlin's report on the architecture of the last thirty years one must hope that in another decade, when a considerable part of Costa's plan for Brasilia has been realized and such other vast schemes as Moreira's University City come to completion, he will repeat the performance. Certainly all who are interested in the achievements of the twentieth century will find here unusually heartening material for an optimistic judgment on the results of the transplantation of European modern architecture to the New World.

H.-R. HITCHCOCK
Smith College

BOOKS RECEIVED

(Mention of a book here does not preclude its subsequent review.)

François Bucher, *Notre-Dame de Bonmont* (New York: Wittenborn & Co., American distributor, 1957). $6.85.

John Gloag, *Guide to Western Architecture* (New York: Macmillan Co., 1958). $12.50.

Grant C. Manson, *Frank Lloyd Wright to 1910* (New York: Reinhold Pub. Corp., 1958). $10.00.

N. Pevsner and I. A. Richmond, *The Buildings of England, Northumberland* (Baltimore: Penguin Books, 1957). $1.95.

Through unceasing effort Nikolaus Pevsner and his colleagues have produced the twelfth volume in this series designed eventually to cover the whole of England. Piece by piece the parts of the puzzle are fitting together. Some time has elapsed since the eleventh volume was printed, but owing to generous financial assistance the project now continues. The photographs are excellent. Still bothersome is the abbreviation for centuries (C14 or C17). By transposing the number and letter (14C or 17C) it would be easier for the orderly mind to comprehend.

David H. Pinkney, *Napoleon III and the Rebuilding of Paris* (Princeton: Princeton University Press, 1958). $6.00.

Louis H. Sullivan, *The Autobiography of an Idea* (New York: Dover Pub., 1958). $1.85 paper bound.

The necessary companion to all "functionalists" is now reissued with a short introduction by Ralph M. Line and thirty-five well-chosen recent photographs. Upon perusing the pages of this intimate journal one is fascinated by Sullivan's frequent revelation of his slow process of overcoming youthful naïveté. For instance, on learning that Cudell, not Jenney, had designed the Portland Block in Chicago, Louis said, "he had supposed that all architects made buildings out of their own heads, not out of the heads of others."

Isabel M. S. Whittier, *Some Historical Cities in the British Isles* (New York: Pageant Press, 1957). $3.00.

The book is essentially a layman's guide to famous and some not so famous cities of the British Isles. Although there is a generous number of good photographs, mainly of architecture, the architectural historian will be disappointed by superficial criticism. The historical data packed into the pages is more significant, but the traveller will still want his Baedeker.

PERIODICALS RECEIVED.

Archivo Español de Arte, Madrid, Spain. No. 119. July–Sept., 1957.
Journal of the Royal Society of Arts, London. No. 5018. Jan., 1958.

No. 5019. Feb., 1958.

The report on a second conference on "Perils and Prospects in Town and Country" arranged by the Society in November, 1957 will interest those concerned with town planning problems.

LETTERS

Editor, *SAH* JOURNAL

Dear Sir:

Perhaps architectural historians in the United States might like to pursue the following suggestions—if not run into the ground already—for they are clearly of more use at that end than this:

1. The neglected importance of the short-lived Boston Exchange Coffee House in the history of American hotels and of tall buildings generally. For description and engraved view see Snow's *History of Boston* (my 2nd edition 1828, text pp. 329 f.). Built 1808, seven stories high with domed galleried rotunda running up whole height of building, about 210 rooms and offices plus large dining room and "arched" ballroom and a public reading room (Kilham boasted Tremont House first with this)—the whole business burned down 1818 (marvellous description of "this sublime wreck of matter"). Isaiah Rogers, who was to build Tremont House in 1828, came to Boston in 1816 and would have seen it. So far as British background concerned, nothing (even warehouses?) so tall south of Edinburgh at that date. Does anyone know who the architect was? Shouldn't the pre-eminence of the Tremont House be reconsidered?

2. The possible influence on Mulberry (South Carolina, 1714) of Swedish 17th-century engravings. Erik Dahlberg the Swedish architect and topographical delineator, started his drawings of Swedish buildings in, I believe, 1661 and the series went on into the next century, being engraved by Perelle, Marot and other well-known engravers in Paris and Stockholm. While first issued in book form in about 1716, as *Suecia Antiqua et Hodierna*, I believe separate engravings were issued at least from the 90's. The French plan with corner pavilions had been adopted by the Swedes in a big way, usually crowned with their own version of the North European double-curve roof, the *satere* roof—which will be discussed in Paulsson's *Scandinavian Architecture* to be published later in 1958 by Leonard Hill Books in London (advertisement).

3. The early career of Peter Banner, architect of Park Street Church, Boston, 1809. From a recent talk by a member of the Survey of London staff of the L.C.C. to the R.I.B.A. Library Group on the records of Hackney Church (1790's by Spiller, burned down 1955, records salvaged), it appears that the carpenter whose bankruptcy impeded proceedings was named Peter Banner. For further details write Mrs. Draper, Survey of London County Hall, London S.E. 1.

Priscilla Metcalf
London

SAH NEWS

AVERY LIBRARY CATALOG

The Catalog of the Avery Memorial Architectural Library at Columbia University is being published in book form.

In addition to architecture, the Avery Library contains extensive material in the related fields of archaeology, rare topographical prints, landscape planning, military architecture, sculpture, mosaics, interior design, furniture, other decorative arts, as well as housing and city planning.

The catalog cards will be reproduced in book form by offset printing, 6 volumes of 2,000 pages each, 21 cards to a page 10″ x 14″, bound in full buckram. Approximately 240,000 entries. Price is $300. Orders should be sent to Micro-Photography Co., 97 Oliver Street, Boston 10, Massachusetts.

THE AUGUST TOUR

The annual August Field Trip of the Society will be held in and around Rochester, New York. Miss Gerda Peterich is in charge with Daniel M. C. Hopping as advisor. Notices will be sent to the membership when the date is determined.